Final Staff Assessment

EASTSHORE ENERGY CENTER

Application For Certification (06-AFC-6)
City of Hayward

CALIFORNIA ENERGY COMMISSION

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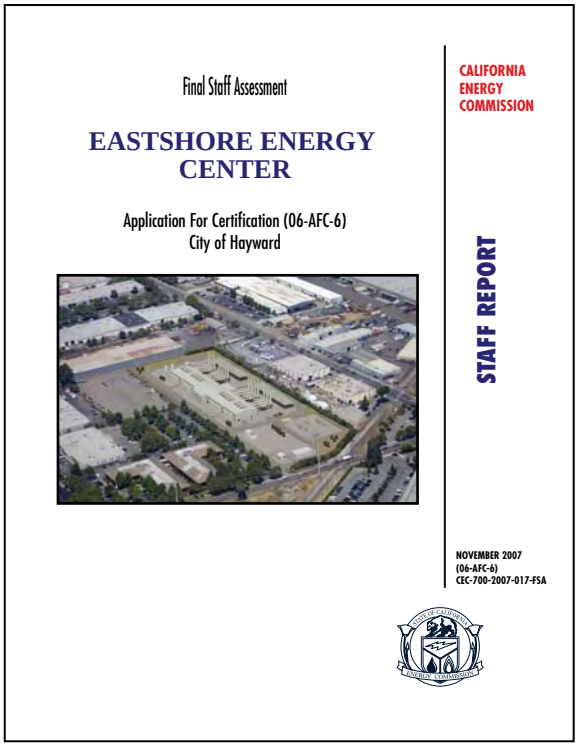

CALIFORNIA ENERGY COMMISSION

SITING OFFICE

William Pfanner
Project Manager

Roger E. Johnson
Siting Office Manager

ENERGY FACILITIES SITING DIVISION

Terrence O'Brien
Deputy Director

EASTSHORE ENERGY CENTER
(06-AFC-6)
FINAL STAFF ASSESSMENT

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INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the Eastshore Energy Center (Eastshore) Application for Certification (06-AFC-6). The FSA examines engineering, environmental, public health and safety aspects of the Eastshore project, based on the information provided by the applicant (Eastshore Energy, LLC) and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR. The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and conditions of certification for construction, operation and eventual closure of the project, if approved by the Energy Commission.

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

PROJECT LOCATION AND DESCRIPTION

The proposed Eastshore site is a 6.22-acre parcel located at 25101 Clawiter Road in the city of Hayward, Alameda County, in an area zoned for industrial use (**Project Description Figure 1** shows the regional and local settings for the proposed project). A large industrial building and paved asphalt parking facility currently occupy the parcel. A commercial office complex and parking lot are located to the immediate south of the proposed Eastshore site, and existing light-to-medium industrial facilities are located to the west and east. The Union Pacific Railroad corridor forms the northeast corner of the parcel and Clawiter Road borders it on the east. The nearest residential area lies approximately 1,100 feet from the site entrance, directly east of the site. There are seven sensitive receptors within one mile of the project, including schools and a convalescent hospital. Two hospitals are located approximately 1.6 miles from the site.

Two major transportation corridors, Interstate 880 (I-880) and State Route 92 (SR-92), serve Hayward. I-880 runs northwest-southeast, approximately 1.3 miles from the

proposed Eastshore site. SR-92 runs east-west, approximately 0.6 mile south of the proposed Eastshore site, and intersects both I-880 and another major local route, I-580. Considerable industrial and commercial development exists both along I-880 and along portions of SR-92. Both are in close proximity to the proposed Eastshore site. Railroad lines and spurs are also located in the area. The project site is also located approximately one mile south of the Hayward Executive Airport.

Eastshore is designed as a 115.5 megawatt (MW) nominal capacity intermediate/peaking load facility which has been proposed to provide local reliability for the greater Bay Area in addition to voltage support to the regional 230 kilovolt (kV) transmission system during both peak demand hours and when other generation is not available. As described in the AFC, Eastshore's quick start capability is designed to respond to unexpected changes in regional demands from higher-than-expected summer temperatures, other facilities tripping off line, or sudden changes in renewable power generation. Eastshore would be permitted to operate up to 4,000 hours annually, equivalent to an annual capacity factor of 45.7 percent.

The Eastshore facility would consist of 14 Wartsila 20V34SG natural gas-fired reciprocating engine generator sets. Each of the 14 exhaust stacks would be 70-feet tall, 4-feet in diameter at the top and 8-feet in diameter at the base. Total site generating capacity is approximately 118 MW gross or 115.5 MW net. Each generator set will have a gross capacity of approximately 8.4 MW, based upon a design temperature range of 32ºF to 100ºF.

The Eastshore project would connect to PG&E's Eastshore Substation by a new approximately 1.2 mile long transmission line. This transmission line would be supported by new 115-kV transmission wood or steel poles in the existing corridor of PG&E's 12-kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115-kV transmission lines, the 85-foot pole structures would support the 115-kV transmission lines with underbuilt 12-kV distribution lines to accommodate the existing PG&E transmission lines along Clawiter Road, and a 90-foot pole structure would be placed on the south side and 60-foot pole structure on the north side of Highway 92. The transmission route will follow the existing PG&E 12-kV distribution lines along Clawiter Road, overcross State Route 92 and interconnect into the PG&E Eastshore substation, approximately 1.1 miles south of the site. Natural gas would be supplied to the proposed Eastshore Project via a 200-foot pipeline connection to PG&E's Pipeline 153, which is on the opposite side of Clawiter Road from the proposed project.

Eastshore was selected by PG&E through its 2004 Request for Offers (RFO) for new non-renewable generation resources. The Eastshore project was one of seven selected projects and was ultimately chosen over others because of its location within an area needing 230-kV voltage support. It will also service local loads currently fed from PG&E's 115-kV distribution system, reducing inefficiencies from importing power on the 230-kV transmission system which must then be stepped down to 115 kV to service local loads.

PUBLIC AND AGENCY COORDINATION

On October 4, 2006, the Energy Commission staff provided the Eastshore project description to a comprehensive list of libraries, agencies, organizations and residences/business within 1,000 feet of the proposed project. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On January 29, 2007, an Information Hearing and a Site Visit for the Eastshore project were conducted at Chabot College in the city of Hayward. Four publicly noticed staff workshops have been held in Hayward. Topics discussed include: Air Quality, Alternatives, Cultural Resources, Land Use, Noise, Soil and Water Resources, Traffic and Transportation, Transmission System Engineering, Visual Resources, Waste Management, Hazardous Materials Management, Public Health, and Local System Effects. In addition to these workshops, extensive coordination has occurred with the numerous local, state and federal agencies that have an interest in the project.

Prior to the January 29, 2007 Site Visit and Information Hearing, staff conducted a Data Response and Issues Resolution Workshop for discussion of the applicant's responses to staff's Data Request Set #1. Agency representatives from the city of Hayward were in attendance and a number of concerns were discussed, including traffic and transportation, alternatives, and land use.

On March 19, 2007, staff conducted a workshop in the city of Hayward to discuss Project Alternatives and Transmission System Engineering. At this workshop, a number of issues and questions were raised by the public participants and the city regarding:

- the requirement for a transmission system connection to the Eastshore substation, as opposed to other PG&E substations in the Hayward region;
- details regarding placement of poles along the approximately 1.25 miles of proposed transmission line from the proposed site at 25101 Clawiter Road to the Eastshore substation and the potential for biological impacts;
- details regarding potential local benefits of power production; and
- public concern at an apparent lack of involvement and availability on the part of PG&E which has a Power Purchase Agreement contract with the Eastshore applicant, in the city's hearings and the Energy Commission's workshops.

On May 23, 2007 staff conducted a Data Response and Issue Resolution Workshop in the city of Hayward to resolve outstanding issues with the applicant and to discuss community concerns.

On June 6, 2007, the Energy Commission conducted a joint status conference in the city of Hayward for both the Eastshore and Russell City Energy Center projects. This meeting provided a public forum allowing the applicants, Commission staff, interested parties, governmental agencies, and members of the public to discuss the projects, proposed schedules and other issues pertinent to these two proceedings.

On August 17, 2007 the Eastshore Energy Center Preliminary Staff Assessment (PSA) was published and circulated for public review and comment. Staff conducted a public workshop on the PSA on September 6, 2007 at the Hayward City Hall. All comments on the PSA were taken into consideration in preparing the FSA.

Staff has worked closely with key agencies in the preparation of the FSA, including agency participation at the Information Hearing and workshops, and communication with the city of Hayward, Alameda County, Bay Area Air Quality Management District (BAAQMD), the Alameda County Airport Land Use Commission, and the Federal Aviation Administration. Staff has also considered the comments of intervenors, community groups, and individual members of the public.

Staff has received over 1,500 written and verbal comments from the public on the Eastshore project. When possible, comments on major issues have been addressed in the FSA under a **RESPONSE TO AGENCY AND PUBLIC COMMENTS** heading in various sections. In addition to the approximately 89 individual letters and e-mails received, staff has received numerous form letters in opposition to the project with individual comments added. There were 268 comments stating general opposition, 162 regarding air quality concerns, 117 on public health, 53 on land use, 19 on socioeconomics and property values, 13 on biological resources, 28 on visual resources, 5 on transmission line safety and nuisance and 19 on noise.

In addition to the communication expressing opposition, staff received 13 letters expressing support for the project.

ENVIRONMENTAL JUSTICE

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

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

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

A greater than 50 percent minority and low-income population has been identified within a one-mile radius of the Eastshore site. Staff has identified significant indirect and cumulative adverse impacts in two of the 11 sections of the FSA evaluated for environmental justice screening: Land Use and Traffic and Transportation. However, the issues of aviation safety and land use compatibility affect all people, regardless of ethnicity or economic status. Therefore, the construction and operation of the Eastshore project, although identified as having a significant environmental impact, is not considered to have a disproportional impact on an environmental justice population. Staff has worked closely with the city of Hayward and the residents of the area to identify local mitigation measures designed to reduce to the greatest extent possible any impact that will occur in the community surrounding the proposed project.

The following provides a summary of staff's examination of impacts on an identified environmental justice population (greater than 50 percent minority or low-income), per the Energy Commission's environmental justice screening standards.

OUTREACH

Staff's environmental justice outreach has been incorporated into its overall outreach activity facilitated by the Public Advisor's Office. This activity is summarized in the **INTRODUCTION** to the FSA.

STAFF'S ASSESSMENT

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

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

- response to public and agency comments
- proposed conditions of certification; and
- recommendation on project approval or denial.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the Eastshore project will not comply with all applicable laws, ordinances, regulations, and standards (LORS), and that significant adverse direct and cumulative impacts have the potential to occur in the areas of Land Use and Traffic and Transportation. For a more detailed review of potential impacts, see staff's technical analyses in the FSA. The status of each technical area is summarized in the table below.

The discussion following the table identifies the issue areas in the FSA that staff has identified as not complying with LORS or having a potentially significant adverse impact which cannot be mitigated to a less than significant level.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	**No**	**No**
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	**No**	**No**
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

LAND USE

Siting of the Eastshore facility at the proposed location within the Hayward Executive Airport's Airport Approach Zoning Plan (AAZP) is inconsistent with the purpose expressed in Hayward Municipal Code §10-6.00. It is also inconsistent with the

Alameda County Airport Land Use Policy Plan (ALUPP) to promote land uses compatible with the airport operations and the safe, efficient use of an airport's airspace.

The Eastshore project could be a hazard to aircraft (small planes and helicopters) flying over the site at less than 1,000 feet above ground level (AGL) which would be more objectionable than other uses within the Industrial District. Therefore, siting of the project at the proposed location is inconsistent with Hayward Municipal Code §10-1.140.

The Alameda County Airport Land Use Commission adopted a resolution that recommended that the Eastshore project be located at an alternate site outside the Airport Influence Area for the Hayward Executive Airport.

The project would interfere with and restrict existing and future operations of the Hayward Executive Airport. This is a significant adverse direct impact for land use.

The cumulative effect of the Eastshore and nearby Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. Potential mitigation such as pilots seeing and avoiding both power plants is impractical and in some cases unattainable. The FAA notes that the potential for constraints to airport operations create a tangible impact on the future use of the Hayward Executive Airport if the facility is approved at the proposed site. Energy Commission staff concludes that the project's incremental effect, in conjunction with the operation of the RCEC project, is cumulatively considerable.

Power plant operation, as proposed in this Application for Certification (AFC), is consistent with the primary use classification of "manufacturing" in the Industrial Zone, but, due to certain operational elements, would normally require a conditional use permit (CUP) to be sited at the proposed location. However, the project is inconsistent (not in harmony) with various city of Hayward regulations and policies, including Municipal Code §§10-1.140, 10-1.1620, and 10-6. Upon consideration of the findings required to justify approval of a CUP, Energy Commission staff has concluded that all the necessary findings cannot be made. Approval of the Eastshore project without meeting the requirements for a CUP would be inconsistent with the Municipal Code §10-1.1620 (b)(1)(a) and §10-1.3225.

TRAFFIC AND TRANSPORTATION

Staff agrees with the Federal Aviation Administration (FAA) recommendation that aircraft should not fly over the Eastshore Energy Center (Eastshore) site below 1,000 feet above the ground because thermal plumes could present a potential hazard to aircraft (small planes and helicopters). However, it is not feasible for aircraft to fly above 1,000 feet because the pattern altitude for the Hayward airport (Runway 10R/28L) is limited to 600 feet due to over-flight of aircraft on approach to Oakland International Airport and cannot be raised.

Staff agrees with the California Department of Transportation, Division of Aeronautics (Caltrans) recommendation. Concurring with FAA regarding the project's thermal plumes, Caltrans recommends the Eastshore facility be located at a site sufficiently distant from the Hayward Executive Airport (Runway 10R/28L) to avoid impairing pilots' ability to control or maneuver their aircraft. The Alameda County Airport Land Use

Commission passed a resolution recommending that the Eastshore facility be located outside of the Airport Influence Area for the Hayward airport.

The project site's proximity to the traffic pattern for the Hayward Executive Airport and the downwind departure route for Runway 28L would unreasonably complicate aircraft maneuverability. It would also limit the airspace available for aircraft transit, maintenance flights, training procedures, and normal departures/arrivals that currently occur relatively unimpeded within this portion of the Hayward airport airspace. This would be a significant adverse impact under CEQA that could not be avoided if the project were developed at the proposed location.

The cumulative effect of the Eastshore and Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. FAA and Caltrans agree that it is impractical and in some cases unattainable for pilots to see and avoid both power plants while attending to their primary responsibility of safely operating their aircraft. The project's contribution to this significant adverse impact would be cumulatively considerable.

The project would not conform with the purpose of the City of Hayward Airport Approach Zoning Regulations (Hayward Municipal Code) because project-generated thermal plumes could present a hazard to aircraft flying at pattern altitude. Therefore the project would not conform to all applicable LORS.

ALTERNATIVES SUMMARY

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation, Section15126.6(a), provides direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The FSA examined the six site location alternatives proposed in the Eastshore AFC: Tierra Alternative Sites 1, 2, 3, 4, 5, and 6. These alternative sites are located in the general area of the proposed Eastshore site and share some common attributes. Four additional sites in the city of Fremont and one site in the city of Newark were identified: Staff Alternative Sites A, B, C, D and E. Staff also investigated the use of alternative energy technologies.

As determined by Energy Commission staff in the FSA, the Eastshore Project as proposed would likely cause potentially significant impacts to current/future airport operations, and would therefore, be inconsistent with land use policies. The Tierra Alt. 2 site would pose similar aviation impacts. The remaining two Hayward alternative sites (Tierra Alts. 1 and 5) would have similar aviation and land use concerns because they would also be subject to the same overflight restrictions and could therefore increase the potential risk of accident in a further constrained air space as the proposed Eastshore project. As noted previously, PG&E has stated that the Tierra Alt. 1 site would not be available to Eastshore.

The two alternative sites located outside of Hayward (Staff Alt. D and Staff Alt. E) would not pose potential impacts to aviation operations. These two sites would connect to the Newark substation, thus not meeting one of the Eastshore project objectives. The two sites would require construction of significantly longer transmission lines. These two sites would also require a variance to local zoning requirements. Staff Alt. E could create ground-level traffic impacts, although these would likely be less than what would occur for the Eastshore project and would likely be mitigated.

Staff does not believe that alternative technologies (geothermal, solar, wind, biomass, hydroelectric) present feasible alternatives to the proposed project.

Based on the analysis of alternative sites, Staff Alternative Site D reduces the significant impacts of the Eastshore project and environmental impacts associated with this site appear to be of a lesser magnitude than for the other alternatives.

NOTEWORTHY PUBLIC BENEFITS

Eastshore offers the benefit of providing additional electricity during times of peak load at a central location in the Bay Area region. Local generation can both help meet local and regional needs and provide grid support for a broader range of resources outside the Bay Area. Eastshore is proposing provisions for future black start capability, which would enable the local electrical system to recover more quickly in the event of an outage. These benefits may outweigh the environmental and social costs incurred in the construction and operation of the proposed project.

As stated in the AFC, the following benefits are identified in association with the Eastshore project.

- Generation of electricity using clean fuel (natural gas);
- Utilization of generation technology that minimizes pollutant emissions;
- Use of BACT to control emissions;
- Reduction of vehicle traffic and related air emissions from previous or anticipated other typical uses of existing buildings;
- Provision of emission reductions for offsets pursuant to agency regulations and provisions; and
- A very low water demand relative to other industrial facilities.

Staff has identified additional noteworthy public benefits as listed below.

LOCAL SYSTEM EFFECTS

The Eastshore project would reduce transmission system losses between 6.5 MW and 19 MW. Over 20 years of operation, the savings to ratepayers have a present value of between $11.4 million and $16.3 million. As well as reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in fossil fuel use, water use, and air emissions by reducing the need for additional generation sources.

A primary benefit of the Eastshore project is as a local source of generation (in addition to the RCEC plant) that will serve load demands in the cities of Hayward, Fremont, and San Leandro in the southern East Bay area, and also the San Francisco Peninsula because of its unique location near the east shoreline of the San Francisco Bay and its proximity to the existing transmission network. It will also help reduce overloads, low voltages, and congestion in the SF East Bay Area and may additionally help in real-time operation.

The Eastshore project could be connected to the California ISO-controlled grid with the projects identified in the current transmission plan, and no new or modified grid facilities would be required to accommodate interconnection of the Eastshore project.

The Eastshore project would increase reactive margins in the southern East Bay Area and San Francisco Peninsula, thereby improving voltage stability and system reliability.

SOCIOECONOMICS

Important public benefits discussed under the fiscal and non-fiscal effects section of the FSA are: capital expenditures, construction payroll, annual property taxes and sales taxes, and the value of locally purchased construction and operation equipment and materials.

RECOMMENDATIONS AND SCHEDULE

Commission staff has concluded that even if all mitigation measures and recommended conditions of certifications are adopted by the Commission and implemented by the applicant, all applicable LORS will not be complied with and significant adverse direct and cumulative environmental impacts to Land Use and Traffic and Transportation would likely result from the Eastshore project. Energy Commission staff has concluded that the project would be inconsistent with LORS pertaining to air traffic patterns and the utility of the Hayward Executive Airport and the surrounding airspace. In addition, the project does not conform with the purpose of the city of Hayward Airport Approach Zoning Regulations (HMC(c), §10-6.00) or to the purpose or requirements of several city of Hayward LORS.

Although the project will result in non-compliance with LORS and significant direct and cumulative environmental impacts, staff concludes there will not be a disproportionately high and adverse human health or environmental effect on a minority and/or low-income population, and thus, no disproportional impact to an Environmental Justice population.

Staff has also identified that Eastshore offers the benefit of providing additional electricity during times of peak load at a central location in the Bay Area region. Local generation can both help meet local and regional needs and provide grid support for a broader range of resources outside the Bay Area. Eastshore would also have black start capability, which would enable the local electrical system to recover more quickly in the event of an outage. These benefits may outweigh the environmental and social costs incurred in the construction and operation of the proposed project.

In conclusion, based on the information available, staff can not recommend certification of the Eastshore project at the proposed location. However, if the California Energy

Commission grants certification for this project, Energy Commission staff is proposing conditions of certification to ensure that the project is constructed and operated in accordance with applicable LORS and environmental impacts are mitigated to the extent feasible.

INTRODUCTION

William Pfanner

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed Eastshore Energy Center (here after referred to as Eastshore). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

- the proposed project;
- the existing environment;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- 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, local organizations and intervenors which may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified; and
- project alternatives.

The analyses contained in this FSA are based upon information from the: 1) Application For Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent field studies and research, and 6) comments at workshops. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The FSA presents the Energy Commission staff's conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation and closure of the facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. 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 PRELIMINARY STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 20 technical areas. Each

technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, local system effects, 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 20 technical area assessments includes a discussion of:

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

ENERGY COMMISSION SITING PROCESS

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

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

In addition, staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards, and the reliability of power plant operations [Cal. Code Regs., tit. 20, §1743(b)]. Staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations and standards are met [Cal. Code Regs., tit. 20, §1744(b)].

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act (CEQA). No additional Environmental Impact

Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency as meeting all requirements of a certified regulatory program [Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (j)]. The Energy Commission is the CEQA lead agency and is subject to all other applicable portions of CEQA.

The staff initially prepares a Preliminary Staff Assessment (PSA) that presents for the applicant, intervenors, organizations, agencies, other interested parties and members of the public, the staff's analysis, conclusions, and recommendations. After the PSA was published, staff conducted a workshop to discuss its findings, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshop and written comments, staff refined its analysis, corrected errors, and finalized conditions of certification to reflect areas where agreements have been reached with the parties, and published this FSA. Where it is appropriate, the FSA incorporates comments received from agencies, the public and parties to the siting case, and comments made at the workshops.

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. 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.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by the Public Adviser's Office. This is an ongoing process that to date has involved the following efforts:

LIBRARIES

On October 4, 2006, the Energy Commission sent the Eastshore Energy Center AFC to the Hayward Public Library; the Alameda County Library - Fremont main branch, and to libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco. The PSA for the Eastshore Project was published on August 17, 2007 and also made available for review at these libraries.

OUTREACH EFFORTS

The Public Adviser's Office conducted extensive public outreach efforts with local elected officials, business leaders, environmentalists and community groups in Hayward. Local schools, day-care centers, elder-care facilities, hospitals and large employers were initially contacted about the Eastshore AFC, and have been kept informed of ongoing Energy Commission proceedings. A one-page, paid notice (back-to-back English/Spanish) was inserted into the local Hayward newspaper The Daily Review for delivery to subscribers in Hayward prior to the January 29th informational hearing and site visit. Press notices for all data workshops and conferences have also been sent to The Daily Review for public notification purposes.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for the Eastshore project. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the **EXECUTIVE SUMMARY**.

The PSA for the Eastshore project was made available for review at the libraries identified above. The PSA is also available on the Internet. The Energy Commission staff conducted a workshop on the Eastshore PSA on September 6, 2007 at the Hayward City Hall building. The workshop provided an opportunity for agencies, the public and other interested parties to present questions and comments on the PSA.

ENVIRONMENTAL JUSTICE

Executive Order 12898, "Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (USEPA) 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.

For all siting cases, Energy Commission staff conducts an environmental justice screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analysis" dated April 1998. The purpose of the screening analysis is to determine whether a minority or low-income population exists within the potentially affected area of the proposed site.

California Statute, Section 65040.12 (c) of the Government Code, defines "environmental justice" to mean "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." In light of the progress made by federal environmental agencies on environmental justice, the Energy Commission has examined federal guidelines pursuant to its desire to follow environmental justice

principles for the environmental review of this project. Staff's specific activities, with respect to environmental justice for the Eastshore project, are discussed in the Executive Summary.

PROJECT DESCRIPTION

Testimony of William Pfanner

INTRODUCTION

On September 22, 2006, Eastshore Energy, LLC (owner) filed an Application for Certification (AFC) for the Eastshore Energy Center (Eastshore). The AFC seeks approval from the California Energy Commission to construct and operate a nominal 115.5 megawatt (MW) power plant consisting of 14 natural gas-fired reciprocating engine-generator units each rated at 8.4 MW. On November 8, 2006, the Energy Commission accepted the AFC (06-AFC-6) as complete. This determination initiated Energy Commission staff's independent analysis of the proposed project.

PURPOSE OF PROJECT

Eastshore is designed as a 115.5 MW nominal capacity intermediate/peaking load facility which has been proposed to serve load demands of the cities of Hayward, Fremont, and San Leandro in the southern East Bay area and also the load demands of the City of San Mateo in the San Francisco (SF) Peninsula due to its unique location and the existing transmission network. Under certain conditions the Eastshore project could be the only major generator providing electricity to the Hayward area. As described in the AFC, Eastshore's quick start capability is designed to respond to unexpected changes in regional demands from higher-than-expected summer temperatures, other facilities tripping off line, or sudden changes in renewable power generation, such as wind.

Eastshore was selected by Pacific Gas and Electric Company (PG&E) through its 2004 Request for Offers (RFO) for new non-renewable generation resources. The Eastshore project was one of seven selected projects and was ultimately chosen over others because of its location within an area needing 230-kV voltage support. It will also service local loads currently fed from PG&E's 115-kV distribution system, reducing inefficiencies from importing power on the 230-kV transmission system which must then be stepped down to 115 kV to service local loads.

The review of alternatives to meet PG&E's needs for electricity begins with the Integrated Energy Policy Report planning process conducted by the Energy Commission. In that process, a range of needs are identified for PG&E, taking into account the state policy for meeting all electricity needs first by energy efficiency, second by renewable resources and distributed generation, and third by clean fossil fuel generation.

For that need to be met by thermal generation, PG&E conducts a competitive bidding process under the review of the California Public Utilities Commission. A separate solicitation process is conducted for PG&E's procurement of renewable energy resources.

PROJECT LOCATION

The proposed Eastshore site is a 6.22-acre parcel located at 25101 Clawiter Road in the City of Hayward, Alameda County, in an area zoned for industrial use. A large industrial building and paved asphalt parking facility currently occupy the parcel. A commercial office complex and parking lot are located to the immediate south of the proposed Eastshore site, and existing light-to medium-industrial facilities are located to the west and east. The Union Pacific Railroad corridor forms the northeast corner of the parcel, and Clawiter Road borders it on the east. Approximately 1.5 acres of the 4.65 acre area owned by Berkeley Farms, located across Clawiter Road, will be leased to Eastshore Energy for temporary construction and laydown during the construction and commissioning periods.

The proposed Eastshore site is located approximately 14 miles southeast of downtown Oakland. Two major transportation corridors, Interstate 880 (I-880) and State Route 92 (SR-92), serve Hayward. I-880 runs northwest-southeast, approximately 1.3 miles from the proposed Eastshore site. SR-92 runs east-west, approximately 0.6 mile south of the proposed Eastshore site and intersects both I-880 and another major local route, I-580. Considerable industrial and commercial development exists both along I-880 and along portions of SR-92. Both are in close proximity to the proposed Eastshore site. Railroad lines and spurs are also located in the area.

Project Description Figure 1 shows the regional and local settings for the proposed project.

PROJECT OBJECTIVES

As described in the AFC, Eastshore ‘s project objectives are as follows:

- To safely construct and operate a nominal 115.5-MW (net), natural gas-fired, intermediate/peaking load generating facility.
- To deliver electricity to the PG&E Eastshore substation at 115 kV without the need for system upgrades.
- To provide voltage support to the regional 230 kV transmission system.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The Eastshore project will consist of 14 Wartsila 20V34SG natural gas-fired reciprocating engine generator sets. Total site generating capacity is approximately 118 MW gross or 115.5 MW net. Each generator set will have a gross capacity of approximately 8.4 MW, based upon a design ambient temperature range of 32ºF to 100ºF. Eastshore proposes to operate up to 4,000 hours annually, equivalent to an annual capacity factor of 45.7 percent.

Each generator set will be additionally equipped with standard support auxiliaries – for example, a fuel gas system, lube oil system, charge air systems, and an engine cooling system. Supporting the overall plant are a start air system, an instrument/service air system, two 60 percent redundant main step-up transformers, two 100 percent

redundant auxiliary/station service transformers, clean and dirty lube oil storage tanks, a raw water tank, a waste water holding tank, and two 19 percent (by weight) aqueous ammonia tanks, along with associated support equipment.

Air emissions from each generator set will be treated by a selective catalytic reduction (SCR) system (one per engine) for reduction of NO_x emissions, and an oxidation catalyst (one per engine) for reduction of carbon monoxide (CO) and precursor organic compound (POC) emissions. **Project Description Figure 2** shows the general arrangement of the proposed Eastshore facility. **Project Description Figures 3 and 4** provide architectural elevations of the proposed Eastshore project.

ELECTRIC TRANSMISSION

Eastshore would be connected to PG&E's electrical system at the utility's existing Eastshore substation, which is located approximately 1.1 miles south of the proposed Eastshore site. This connection will require a new overhead single circuit 115- kV line that will run near an existing PG&E 12-kV distribution right-of-way. The connection may also require widening the existing right-of-way and replacing 10 to 12 transmission poles with structures designed to accommodate both the 12-kV and 115-kV transmission lines.

NATURAL GAS SUPPLY

Natural gas would be supplied to the proposed Eastshore project via a 200-foot pipeline connection to PG&E's Pipeline 153, which is on the opposite side of Clawiter Road from the proposed project. PG&E will interconnect the proposed Eastshore site by installing a 4.5-inch diameter pipeline via an underground bore originating at the proposed Eastshore site, boring under Clawiter Road and the existing Union Pacific Railroad right-of-way, and connecting to PG&E's existing gas line.

WATER SUPPLY

Eastshore would use approximately 1.6 acre-feet of potable water per year for engine cooling, other power plant processes, site landscape irrigation, and potable and sanitary uses. A closed-loop engine cooling system would both reduce the requirement for water and result in the consumption of approximately one gallon per minute (average annual rate) during plant operation. The City of Hayward would supply potable water for the proposed Eastshore project through an existing connection immediately adjacent to the proposed site, under a contract with the City of San Francisco's Public Utilities Commission.

WASTEWATER DISCHARGE

Sanitary wastewater would be discharged to Hayward's city sewer system via an existing on-site sewer connection. Eastshore will replace the existing on-site sewer system and install a new sewer main on the proposed site that will tie into the existing City of Hayward system on Clawiter Road. Process wastewater would be tested for potential contamination, and, under normal conditions, would also be discharged to the sanitary sewer line. If the wastewater composition is determined to exceed allowable discharge limits, it would be transported off site for treatment and disposal.

PROJECT STACKS/THERMAL PLUMES

The Eastshore project will include fourteen (14) stacks, each approximately 70 feet tall, four feet in diameter at the top and eight feet in diameter at the base. The stacks would be constructed in two clusters of seven stacks each, extending a total of approximately 425 feet in a linear array. Each stack would produce a high velocity thermal plume, with the potential for each seven-stack array to merge into a single plume. The project also includes two radiator exhausts, approximately 20 feet in height. These also produce individual high velocity thermal plumes, but the plumes would not merge.

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, Eastshore proposes to initiate project construction in early 2008. It is expected to take about 18 months for construction and startup testing, and Eastshore could begin commercial operation as early as the second quarter of 2009, assuming there are no unanticipated delays. Construction would be scheduled between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or complete critical construction activities. During some construction periods and during the start-up phase, some activities will continue 24 hours a day, 7 days a week. The peak construction site workforce is expected in months 10 and 11 of the construction period. Peak heavy truck traffic, related to demolition, will occur during months 1 and 2. Construction laydown and parking areas will be within either the proposed Eastshore site and/or a leased parcel across Clawiter Road just to the south of the proposed Eastshore site. Construction access will be from Clawiter Road. Materials and equipment will be delivered by truck. The proposed Eastshore project is expected to employ up to 13 full-time employees. It will be designed as an intermediate/peaking and load-shaping facility to serve PG&E load during periods of high demand, which generally occur during daytime hours, and more frequently during the high-peak summer months than during other times. Per the Bay Area Air Quality Management District (BAAQMD) requirements, the Eastshore project would be allowed to operate up to 4,000 hours per engine per year with no seasonal restrictions. Actual operation will depend upon actual PG&E system demand, California Independent System Operator (California ISO) dispatch requirements and North of Path 15 (NP-15) market conditions.

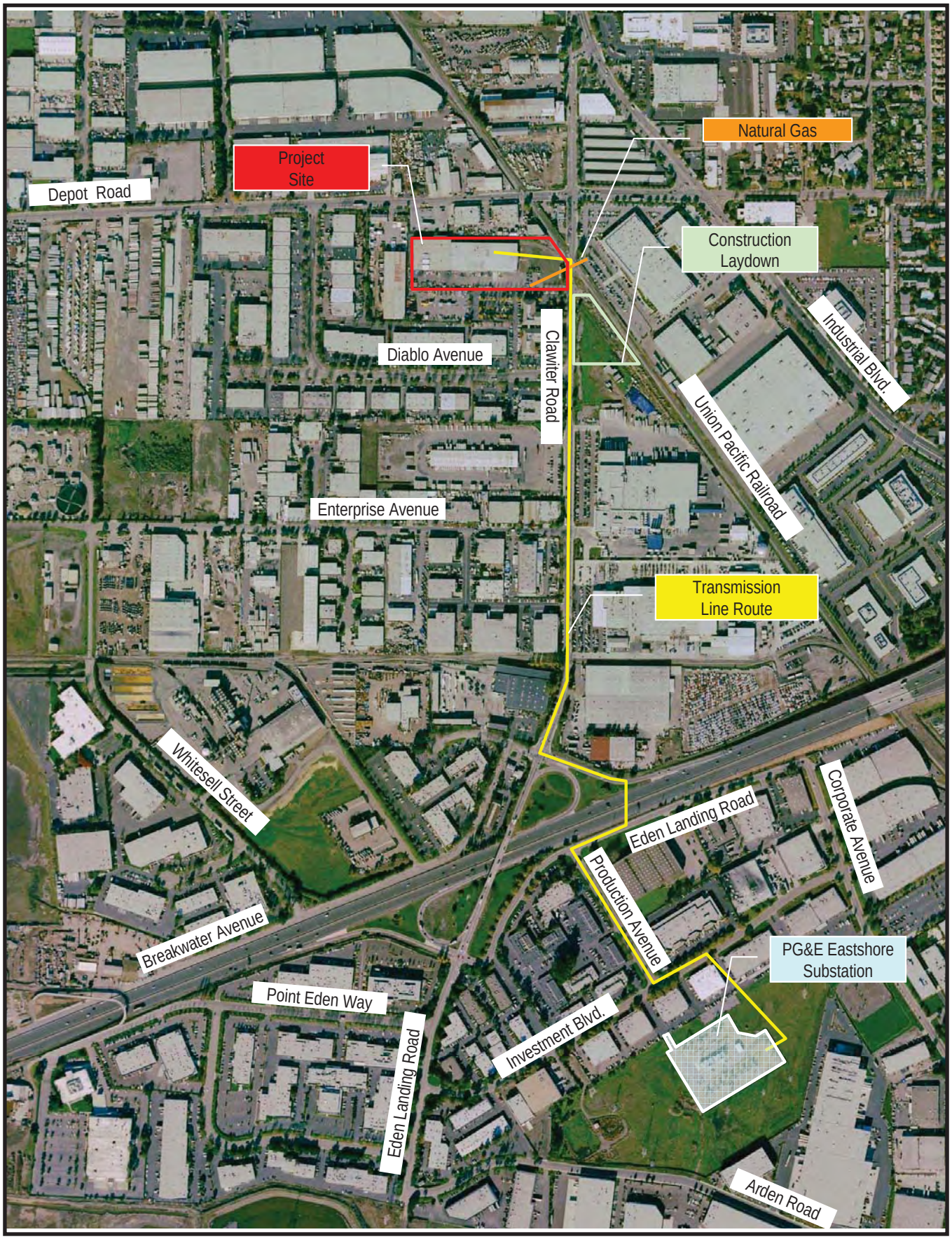
FACILITY CLOSURE

Eastshore would be designed for a 30-year operating life. At some point in the future, the proposed project would cease operation and shut down. At that time, it would be necessary to ensure that the closure occurs in a manner that protects public health and safety and the environment from adverse effects.

Although the setting for the proposed Eastshore project does not appear to present any special or unusual closure problems, it is impossible to foresee exactly what the situation will be 30 or more years down the road when the proposed project ceases to operate. Therefore, provisions must be made to provide the flexibility needed to deal with specific situations and project settings at the time of closure. Laws, ordinances, regulations and standards relating to Eastshore's closure are identified in the technical sections of this assessment. Eastshore's closure would meet the requirements of all laws, ordinances, regulations, and standards in effect at the time of closure.

PROJECT DESCRIPTION - FIGURE 1

Eastshore Energy Center - Site and Linear Facilities Location Map

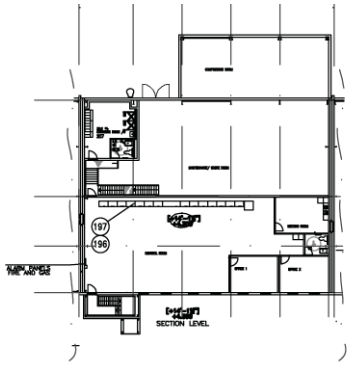


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 2.1-1

PROJECT DESCRIPTION - FIGURE 2

Eastshore Energy Center - Site General Arrangement



BUILDING SECOND FLOOR PLAN

ENGINE HALL & UTILITY BLOCK

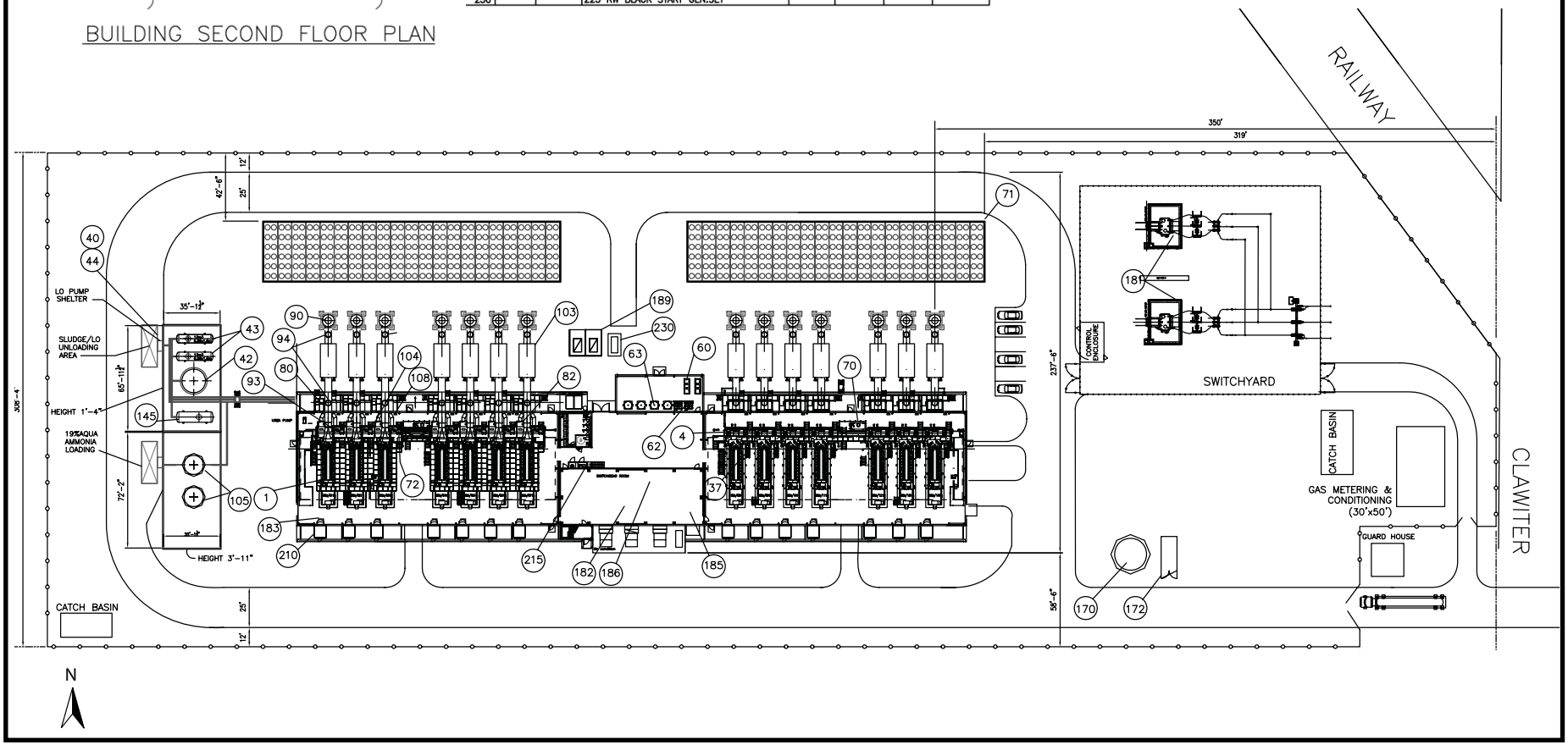
ITEM NO	PCS.	CODE (FIRST)	DESCRIPTION	WEIGHT INCL. LIQUIDS KG	LB	MOUNTING LEVEL MILLIM.	(FLR LEVEL) INCH.
1	14	SQA	ENGINE GENERATOR SET	134700	296962	+0.000	0'– 0"
4	14	QEA	AUXILIARY MODULE	4200	9259	+0.000	0'– 0"
37	14	ZBB	GAS REGULATING UNIT	200	440	+0.000	0'– 0"
60	2	TCA	WORKING AIR UNIT	670	1477	+0.000	0'– 0"
62	2	TSA	STARTING AIR UNIT	710	1565	+0.000	0'– 0"
63	4	TSB	STARTING AIR BOTTLE 9.4M3/2500 GAL	4335	9555	+0.000	0'– 0"
70	2	VBA	MAINTENANCE WATER TANK 4M3/1060GAL	4940	10890	+0.000	0'– 0"
72	14	VEA	EXPANSION VESSEL 600L/160GAL	775	1708	+4.940	16'– 2"
80	14	NGA	CHARGE AIR FILTER	960	2116	+3.100	10'– 2"
82	14	–	CHARGE AIR & EXHAUST GAS MODULE	3000	6613	+3.240	11'– 2"
93	14	NHA	EXHAUST GAS VENTILATION UNIT	55	121	+4.940	16'– 2"
104	14	SEN	DOSING BOX	–	–	+0.000	0'– 0"
108	14	SNC	NOX CONTROLLER	–	–	+0.000	0'– 0"
182	18	–	MV SWITCHGEAR	–	–	+0.000	0'– 0"
183	14	BAN	NEUTRAL GROUNDING RESISTOR	–	–	+0.000	0'– 0"
185	–	BEY	DC–SYSTEM	–	–	+0.000	0'– 0"
186	–	BFA	LV SWITCHGEAR	–	–	+0.000	0'– 0"
189	2	BFB	STATION SERVICE TRANSFORMER	–	–	+0.000	0'– 0"
196	4	CFA	CONTROL PANEL, COMMON	–	–	+0.000	0'– 0"
197	14	CFC	CONTROL PANEL, ENGINE WISE	–	–	+0.000	0'– 0"
210	14	–	VENTILATION UNIT (ENGINEHALL)	2000	4409	–	–
215	14	–	FREQUENCY CONVERTER	–	–	–	–
230			225 KW BLACK START GEN.SET				

MECHANICAL UTILITY AREA

ITEM NO	PCS.	CODE (FIRST)	DESCRIPTION	WEIGHT INCL. LIQUIDS KG	LBS	MOUNTING LEVEL MILLIM.	INCH.
71	42	–	RADIATORS LOW–LOW NOISE RADIATORS	–	–	–	–
90	14	NHA	EXHAUST GAS SILENCER	5200	11454	+5.560	+22'– 5"
94	34	NGA	RUPTURE DISC	–	–	–	–
103	14	–	DENOX (SCR)	14000	30864	+5.560	+22'– 5"
170	1	–	RAW WATER TANK 35,000 GAL	–	–	–	–
172	1	–	FIRE FIGHTING CONTAINER	–	–	–	–
181	2	AET	STEP–UP TRANSFORMER	–	–	–	–
				–	–	–	–

DAY / STORAGE TANK / UNLOADING AREA

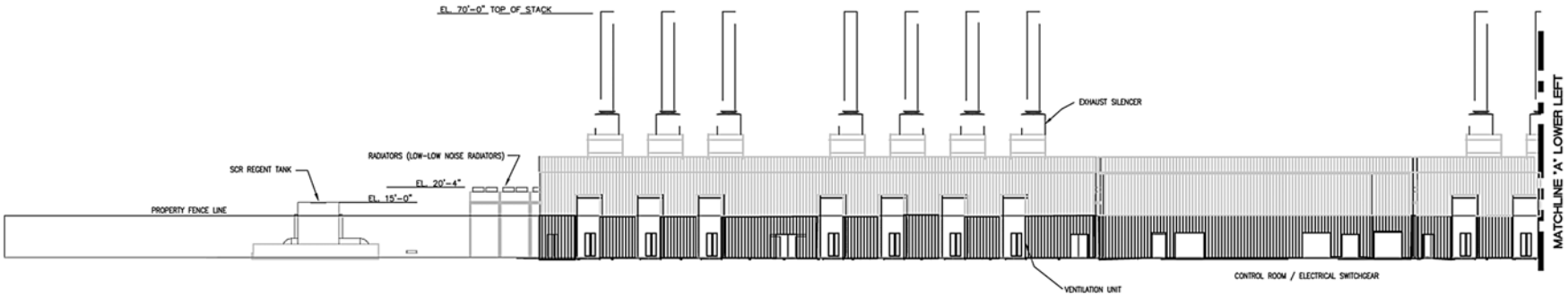
ITEM NO	PCS.	CODE (FIRST)	DESCRIPTION	WEIGHT INCL. LIQUIDS KG	LBS	MOUNTING LEVEL MILLIM.	INCH.
40	1	QAA	LO UNLOADING PUMP UNIT (CLEAN)	–	–	–	–
42	1	QAC	CLEAN LO TANK 55M3/14531GAL	–	–	–	–
43	2	QAD	USED/SERVICE LO TANK 13M3/3434GAL	–	–	–	–
44	2	QAE	LO TRANSFER PUMP UNIT	–	–	–	–
105	2	–	SCR REGENT TANK 10,000 GAL	–	–	–	–
145	1	DDB	DIRTY WATER HOLDING TANK 20M3/5284 GAL	–	–	–	–

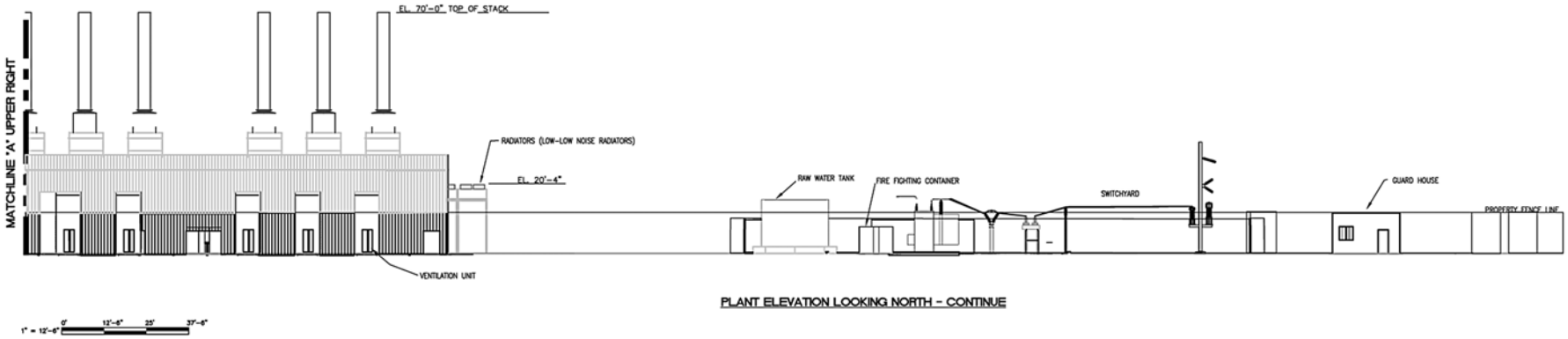


SOURCE: AFC Figure 2.2-1

PROJECT DESCRIPTION - FIGURE 3

Eastshore Energy Center - Plant Elevation Looking North





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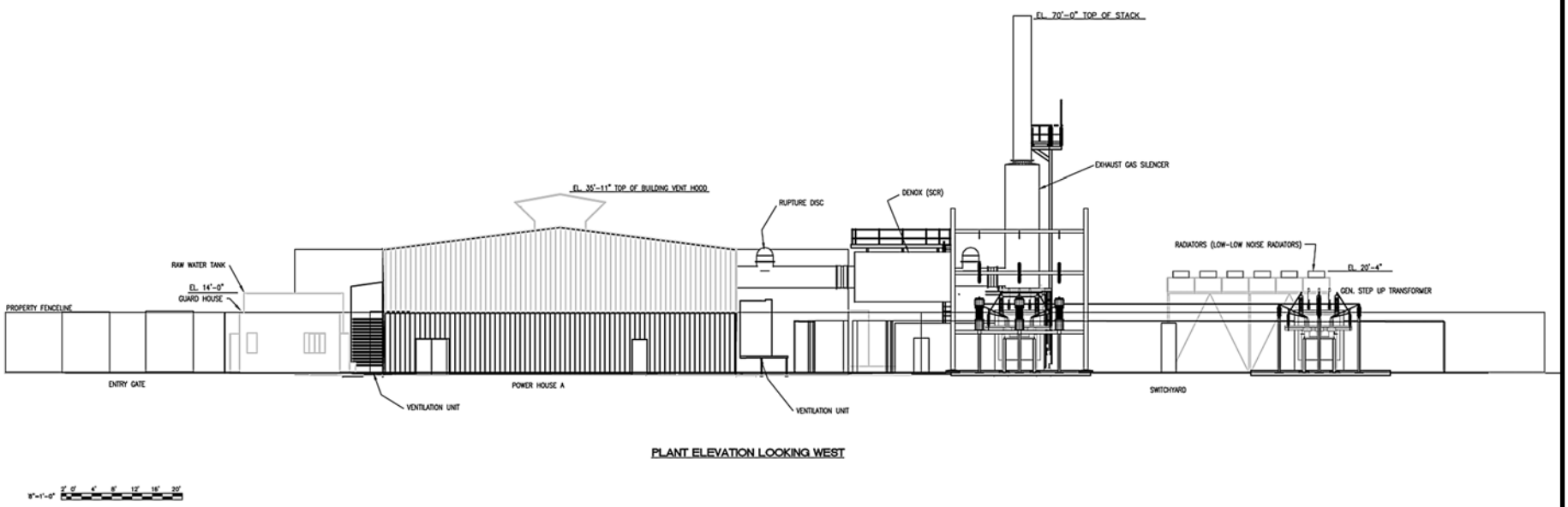
SOURCE: AFC Figure 1.2-4A

PROJECT DESCRIPTION - FIGURE 4

Eastshore Energy Center - Site Elevation Drawing - View Looking West



SOURCE: AFC Figure 2.2-2B

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Brewster Birdsall, P.E., QEP

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification, the proposed Eastshore Energy Center (Eastshore) would likely conform with applicable federal, state and Bay Area Air Quality Management District (BAAQMD) air quality laws, ordinances, regulations and standards (LORS), and that the proposed Eastshore project would not result in significant air quality-related impacts. Staff also finds the following.

- The project would comply with New Source Review and Best Available Control Technology (BACT) requirements. Staff recommended in a letter to BAAQMD dated May 25, 2007 that the project be required to meet a more stringent limit for particulate matter emissions than that originally proposed by the Eastshore applicant, and in October 2007, the BAAQMD established a lower particulate matter limit and rigorous stack testing requirements to verify compliance with that limit.
- In conjunction with offsets required by BAAQMD, additional local or upwind emission reduction credits should be surrendered for mitigation of potential nitrogen oxide emissions during July, August, and September.
- Local or upwind emission reduction credits should be surrendered for mitigation of particulate matter and sulfur dioxide emissions, or a successful wood stove and fireplace replacement program should be implemented to achieve equivalent particulate matter reductions.

INTRODUCTION

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Eastshore project. Criteria air pollutants are defined as air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health. The **Public Health** section describes the effects of criteria pollutants on asthma and other identifiable public health issues.

The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter) (PM10) and fine particulate matter (less than 2.5 microns in diameter) (PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide (NO) and NO_2) and precursor organic compounds (POC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Greenhouse gas (GHG) emissions are also discussed.

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

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

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

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

Applicable Law	Description
Federal	**U.S. Environmental Protection Agency**
CAAA of 1990, 40 CFR 50	National Ambient Air Quality Standards (NAAQS).
CAA Sec. 171-193, 42 USC 7501	New Source Review (NSR) – Requires NSR permit for new stationary sources. This requirement is addressed through BAAQMD Regulation 2.
40 CFR 52.21	Prevention of Significant Deterioration (PSD) – Requires modeling to demonstrate no violation of NAAQS and PSD increments, if applicable [also BAAQMD Reg. 2, Rule 2]. PSD review would not apply to Eastshore because PSD trigger levels would not be exceeded.
40 CFR 60, Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines [also BAAQMD Reg. 10]. Requires the emergency standby generator engine to meet United States Environmental Protection Agency (U.S. EPA) Tier 3 requirements.
40 CFR 60 (Proposed Subpart JJJJ)	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. Proposed standard would require that natural gas-fired engines achieve: 2.0 grams per horsepower-hour (g/bhp-hr) of NOx; 4.0 g/bhp-hr of CO; and 1.0 g/bhp-hr of non-methane hydrocarbons or POC.
40 CFR 70, CAA Sec 401, 42 USC 7651	Federal Title V Operating Permit Program, application required within one year following start of operation [also BAAQMD Reg. 2, Rule 6]. Eastshore is not subject to the Title V operating permit program.
40 CFR 72, CAA Sec 401 42 USC 7651	Title IV Acid Rain – Requires Title IV permit and compliance with acid rain provisions. Applicable only to electrical generating units greater than 25 MW; not applicable to Eastshore.

State	California Air Resources Board and Energy Commission
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with approved clean air plan. The BAAQMD New Source Review (NSR) program is consistent with regional air quality management plans.
California Health & Safety Code Section 41700	Public Nuisance Provisions – Outlaws the discharge of air contaminants that cause nuisance, injury, detriment, or annoyance.

Local	Bay Area Air Quality Management District
BAAQMD Regulation 1, Rule 1	Section 301: Prohibits public nuisances from any facility or source.
BAAQMD Regulation 2, Rule 1	General requirements for air quality permits. Includes criteria for the issuance or denial of permits, exemptions, and appeals against BAAQMD decisions. An Authority to Construct (ATC)is required for any non-exempt source. Natural gas-fired heaters with a heat input rate of less than 10 million Btu per hour are exempt.
BAAQMD Regulation 2, Rule 2	New Source Review – Requires preconstruction review including BACT. Applicable to sources with the potential to emit more than 10 pounds per day (NOx, POC, PM10, CO, or SO_2) and offsets, applicable to facilities with the potential to emit more than 35 tons per year of NOx or POC, or 100 tons per year of PM10 or SOx.
BAAQMD Regulation 2, Rule 3	Permits – Power Plants – Requires Preliminary Determination of Compliance (PDOC) and Final Determination of Compliance (FDOC) by the BAAQMD Air Pollution Control Officer with public notice and public comment prior to ATC. The BAAQMD would issue the ATC after the Energy Commission certifies the Eastshore project.
BAAQMD Regulation 2, Rule 5	NSR of Toxic Air Contaminants – Requires preconstruction review for new and modified sources of toxic air contaminants. Contains project health risk limits and requirements for Toxics BACT. See **Public Health**.
BAAQMD Regulation 6	Limits particulate matter and visible emissions to less than 20 percent opacity.
BAAQMD Regulation 7	Odorous substance discharges. Ammonia emissions limited to less than 5,000 parts per 1,000,000 (ppmvd).
BAAQMD Regulation 8, Rule 3	Architectural coating POC limits and requires use of compliant coatings.
BAAQMD Regulation 8, Rule 4	POC emission limits from surface coating and general solvent use. Emissions from use of solvents limited to less than 5 tons per year.
BAAQMD Regulation 8, Rule 16	Cold solvent cleaner requirements. Requires the use of compliant cold solvent cleaners.
BAAQMD Regulation 9, Rule 1	SO_2 ground level concentration limits of 0.5 ppmvd continuously for 3 minutes or 0.25 ppmvd over 1 hour, consistent with California Ambient Air Quality Standards.
BAAQMD Regulation 9, Rule 8	Internal combustion (IC) engine NOx limit of 140 ppmvd and CO limit of 2,000 ppmvd. Diesel emergency standby generator engine is exempt.

SETTING

CLIMATE AND METEOROLOGY

The San Francisco Bay Area is an area of moderately wet winters and dry summers. The regional climate is dominated by a strong and persistent high pressure system that frequently lies off the Pacific coast. The high pressure cell shifts northward or southward in response to seasonal changes or the presence of cyclonic storms. Along with the offshore high pressure cell, air quality in the Bay Area is affected by persistent temperature inversions, persistent onshore winds, coastal mountain and valley topography, and available sunlight.

Ambient temperatures in the project area are moderated because of its proximity to the San Francisco Bay. During the summer months, average maximum temperatures are between 70 and 80˚F. Average maximum winter temperatures are between 55 and

65˚F. Average minimum temperatures are between 40 and 45˚F in winter and between 50 and 55˚F in the summer. Most of the 14 to 15 inches of annual precipitation occurs in the cooler months, from mid-October to mid-April.

Prevailing winds are generally from the west-northwest as they are channeled by the East Bay hills. Marine air flows across the bay from the Golden Gate and San Bruno Gap to the South Bay and inland valleys via the Hayward/Dublin Canyon and Niles Canyon. Occasional winter storms and offshore flows reverse the winds so that they flow from the east. Average wind speeds are greatest in the spring and summer and weakest in the fall and winter. Night and early morning hours frequently have calm winds in all seasons, while summer afternoons and evenings are quite breezy. Extreme wind speeds are rare and mostly associated with occasional winter storms.

Pollution potential is relatively high in this subregion of the Bay Area during the summer and fall. When high pressure dominates, low mixing depths and bay and ocean wind patterns can concentrate and carry pollutants from other cities to this area, adding to the locally emitted pollutant mix (BAAQMD 1999).

AMBIENT AIR QUALITY STANDARDS

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

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

Current state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (mg or 10^{-3} g) or micrograms (µg or 10^{-6} g) of pollutant in a cubic meter (m^3) of ambient air, drawn over the applicable averaging period.

AIR QUALITY Table 2
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	None
	8 Hour	0.070 ppm (137 µg/m^3)	0.08 ppm (157 µg/m^3)
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	None
Fine Particulate Matter (PM2.5)	24 Hour	None	35 µg/m^3
	Annual	12 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.25 ppm (470 µg/m^3)	None
	Annual	None	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	None
	3 Hour	None	0.5 ppm (1300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual	None	0.03 ppm (80 µg/m^3)

Source: ARB, February 2007 (Note: New 1-hour NO_2 CAAQS of 0.18 ppm [338 µg/m^3] and annual NO_2 CAAQS of 0.030 ppm [56 µg/m^3] are expected to be approved by the Office of Administrative in late 2007.)

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

EXISTING AMBIENT AIR QUALITY

Air Quality Table 3 summarizes the attainment status of the air quality in the San Francisco Bay Area. Violations of federal and state ambient air quality standards for ozone, particulate matter, and CO have occurred historically throughout the San Francisco Bay Area. Since the early 1970s, substantial progress has been made toward controlling these pollutants. Although some air quality improvements have occurred, violations of standards for particulate matter and ozone persist.

AIR QUALITY Table 3
Attainment Status of Bay Area Air Quality Management District

Pollutants	Federal Classification	State Classification
Ozone	**Nonattainment (Marginal)**	**Nonattainment (Serious)**
PM10	Attainment	**Nonattainment**
PM2.5	Attainment	**Nonattainment**
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Source: ARB 2007 (http://www.arb.ca.gov/desig/desig.htm).

Nonattainment Criteria Pollutants

Air Quality Table 4 summarizes the existing ambient monitoring data for nonattainment criteria pollutants collected by ARB and BAAQMD from monitoring stations closest to the project site. Data marked in **bold** indicates that the most-stringent current standard was exceeded. Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment.

AIR QUALITY Table 4
Eastshore, Highest Measured Concentrations (ppm or μg/m^3)

Pollutant, Location	Averaging Time	2003	2004	2005	2006	2006 Date
Ozone (ppm) Hayward, La Mesa	1 hour	**0.116**	0.088	0.093	**0.101**	Jul 17
Ozone (ppm) San Leandro, Hospital	1 hour	**0.097**	**0.104**	**0.099**	0.088	Jul 22
Ozone (ppm) Fremont, Chapel Way	1 hour	**0.123**	0.090	**0.105**	**0.102**	Jun 22
Ozone (ppm) Hayward, La Mesa	8 hour	**0.092**	0.070	0.070	**0.071**	Jul 17
Ozone (ppm) San Leandro, Hospital	8 hour	**0.071**	0.066	0.061	0.066	Aug 9
Ozone (ppm) Fremont, Chapel Way	8 hour	**0.090**	**0.071**	**0.078**	**0.074**	Jun 22
PM10, Fremont (μg/m^3)	24 hour	37.2	48.9	**54.1**	**56.6**	Dec 7
PM10, Fremont (μg/m^3)	Annual	18.2	18.6	17.8	20.0	---
PM2.5, Fremont (μg/m^3)	24 hour	33.5	**39.9**	33.4	**43.9**	Dec 25
PM2.5, Fremont (μg/m^3)	Annual	8.7	9.4	9.0	n/a	---

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed May 31, 2007.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and POC, which interact in the presence of sunlight and warm air temperatures to form ozone. Ozone formation is highest in the summer and fall when abundant sunshine and high temperatures trigger the necessary photochemical reactions, and lowest in the winter. **Air Quality Table 4** shows that the days with the highest ozone concentrations occur between June and August, but that the region's ozone management season (and the BAAQMD "Spare the Air" program)[1] officially runs from June 1 to October 12.

Respirable Particulate Matter (PM10)

PM10 is a mixture of particles and droplets that vary in size and chemical composition, depending upon the origin of the pollution. An extremely wide range of sources, including natural causes, most mobile sources, and many stationary sources, causes emissions that directly and indirectly lead to increased ambient particulate matter. This makes it an extremely difficult pollutant to manage. Particulate matter caused by any

[1] For more information see: http://www.sparetheair.org/.

combustion process can be generated directly by burning the fuel, but it can also be formed downwind when various precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulate matter since the contaminants are not directly emitted, but are rather indirectly formed as a result of precursor emissions.

Gaseous contaminants such as NOx, SO_2, organic compounds, and ammonia (NH_3) from natural or man-made sources can form secondary particulate nitrates, sulfates, and organic solids. Secondary particulate matter is mostly finer PM10, whereas particles from dust sources tend to be the coarser fraction of PM10.

Air Quality Table 5 summarizes the ambient PM10 data collected from monitoring stations near the project site.

AIR QUALITY Table 5
Eastshore, Highest Measured PM10 Concentrations (µg/m^3)

Location	Averaging Time	2003	2004	2005	2006	2006 Date
Fremont	24 hour	37.2	48.9	**54.1**	**56.6**	Dec 7
	Days Over CAAQS	0	0	5.8	4.4	---
	Annual	18.2	18.6	17.8	20.0	---
Livermore	24 hour	32.7	48.8	49.4	**69.2**	Dec 7
	Days Over CAAQS	0	0	0	17.3	---
	Annual	18.9	20.0	18.8	**21.8**	---
Bay Area Region	24 hour	**59.5**	**65.0**	**80.8**	**106.3**	Sep 14
	Days Over CAAQS	18.3	24.5	23.3	77.3	---
	Annual	**24.8**	**26.0**	**24.2**	**35.0**	---

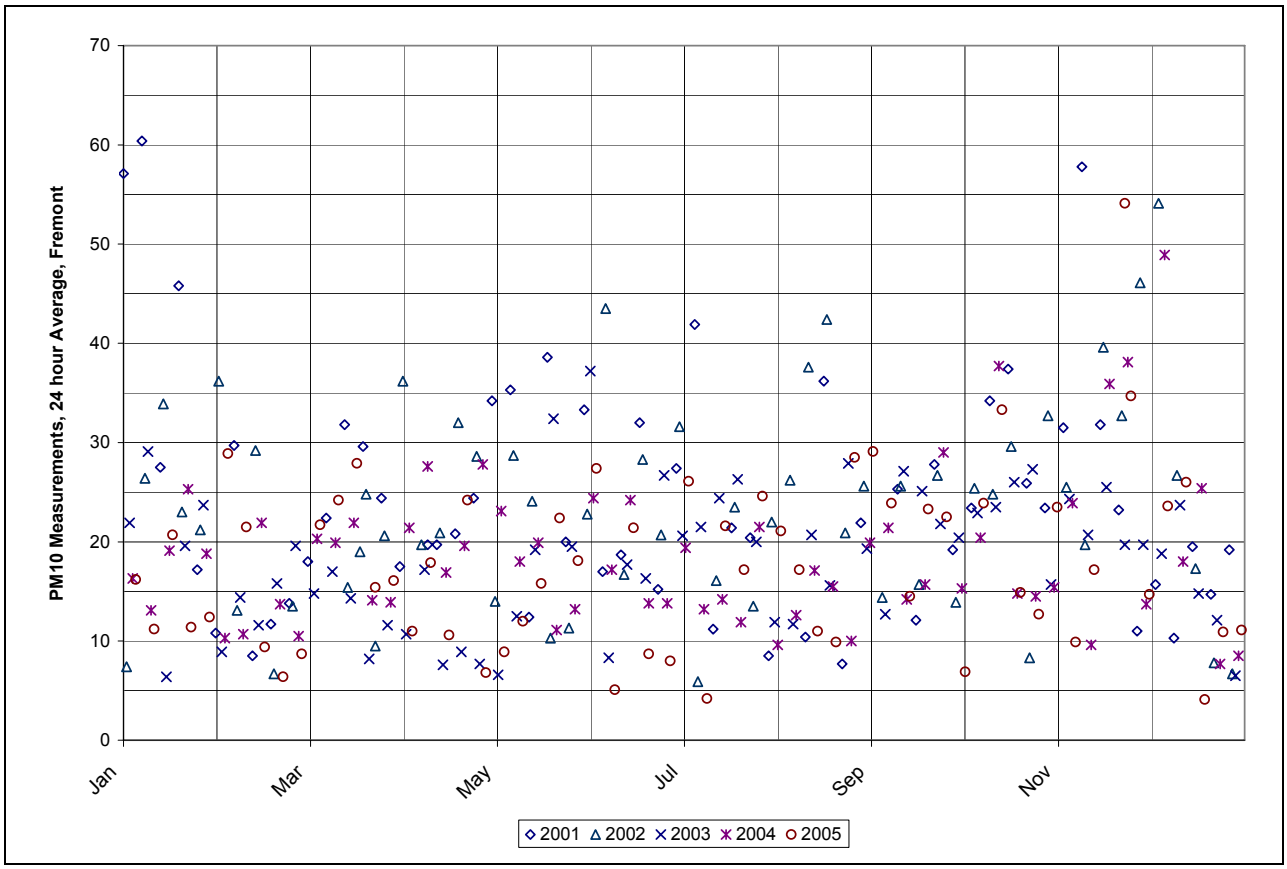
Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed May 31, 2007.

Note: Concentrations shown are based upon California reference methods. The number of days above the CAAQS (50 µg/m^3) is calculated by ARB. Because PM10 is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

Air Quality Table 5 shows that PM10 is primarily a winter problem near the site, but that high regional PM10 levels can occur at other times of the year as well. Multiple years of locally measured ambient PM10 concentrations show that the winter months are the only months when the ambient PM10 concentrations in Fremont exceed the 50 µg/m^3 standard. At Fremont, daily PM10 concentrations are below 50 µg/m^3 for every month except November, December, and January.

Air Quality Figure 1 shows how the local PM10 concentrations vary over the seasons.

AIR QUALITY Figure 1
Eastshore, PM10 Concentrations Measured at Fremont (CAAQS = 50 µg/m^3)



Fine Particulate Matter (PM2.5)

Particles and droplets with an aerodynamic diameter less than or equal to 2.5 microns (PM2.5) penetrate more deeply into the lungs than PM10, so can therefore be much more damaging to public health than larger particles.

PM2.5 is mainly a product of combustion and includes nitrates, sulfates, organic carbon (ultra-fine dust), and elemental carbon (ultra-fine soot). Almost all combustion-related particles, including those from wood smoke and cooking, are smaller than 2.5 microns. Nitrate and sulfate particles are formed through complex chemical reactions in the atmosphere. Particulate nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NOx emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM2.5. Ammonium sulfate is also a concern because of the ready availability of ammonia in the atmosphere. Apportionment studies conducted in San Jose show that sources contribute to winter peak PM2.5 concentrations as follows (ARB 2006a):

- wood smoke/cooking, 38 percent;
- mobile and stationary combustion sources, 29 percent;

- mobile and stationary combustion NOx sources (ammonium nitrate), 26 percent;
- mobile and stationary combustion SOx sources (ammonium sulfate), 3 percent;
- road dust, 2 percent; and
- sea salt, 2 percent.

Air Quality Table 6 summarizes the ambient PM2.5 data collected from three different monitoring stations near the project site.

AIR QUALITY Table 6
Eastshore, Highest Measured PM2.5 Concentrations (µg/m^3)

Location	Averaging Time	2003	2004	2005	2006	2006 Date
Fremont	24 hour	33.5	**39.9**	33.4	**43.9**	Dec 25
	Annual	8.7	9.4	9.0	n/a	---
Livermore	24 hour	42.0	**49.6**	**55.6**	**51.5**	Dec 25
	Annual	9.0	11.4	10.2	n/a	---
San Jose, N. 4th St.	24 hour	**56.1**	**51.5**	**54.6**	**64.4**	Dec 25
	Annual	11.7	11.6	11.8	n/a	---

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed May 31, 2007.

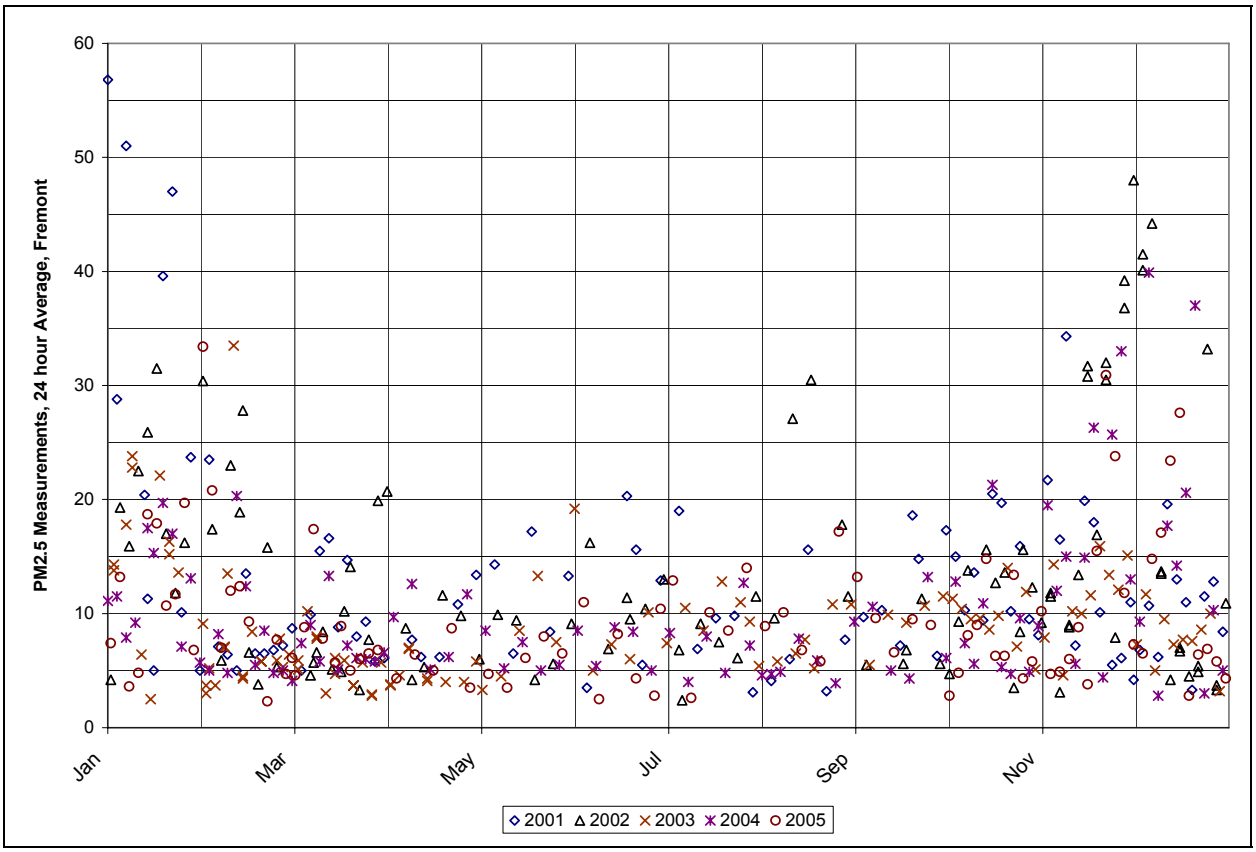
Note: Concentrations are shown based on California reference methods. Days above the recently revised NAAQS (35 µg/m^3) are not yet available from ARB.

Air Quality Table 6 shows that PM2.5 levels go progressively higher from Fremont to Livermore to downtown San Jose. During winter high particulate matter episodes, the contribution of ground level releases to ambient particulate matter concentrations is disproportionately high because of relatively stagnant meteorology. The BAAQMD sponsors particulate matter management programs (including "Spare the Air Tonight")[2] from November to February, when the contribution of wood smoke particles to ground level PM2.5 concentrations may be substantial, or up to one-third of the total concentration on stagnant nights (ARB 2006a).

[2] See: http://www.sparetheair.org/data/index.htm.

Air Quality Figure 2 shows how local daily concentrations of PM2.5 vary over the seasons and that PM2.5 is like PM10 in that it is primarily a winter problem.

AIR QUALITY Figure 2
Eastshore, PM2.5 Concentrations Measured at Fremont (NAAQS = 35 µg/m^3)



Air Quality Figure 2 confirms that PM2.5 concentrations are strongly seasonal, with the highest concentrations limited to the months of November through February. Concentrations exceeding the recently adopted NAAQS of 35 µg/m^3 have only occurred over the past five years in Fremont during the winter months.

Attainment Criteria Pollutants

Carbon Monoxide

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

Nitrogen Dioxide

Approximately 90 percent of the NOx emitted from combustion sources is in the form of nitric oxide, while the balance is NO_2. Nitric oxide (NO) is oxidized in the presence of ozone to form NO_2, but some level of photochemical activity is needed for this conversion. High concentrations of NO_2 occur during the fall (not in the winter) when atmospheric conditions tend to trap ground-level releases but lack significant photochemical activity (less sunlight). In the summer, the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) tend to engage the NO in reactions with POCs to create ozone and also disperse the NO_2. The formation of NO_2 in the summer, with the help of the ozone, is according to the following reaction:

$$NO + O_3 \rightarrow NO_2 + O_2$$

Urban areas typically have high daytime ozone concentrations that drop substantially at night as the above reaction takes place, and ozone scavenges the available NO. If ozone is unavailable to oxidize the NO, less NO_2 will form because the reaction is "ozone-limited." This reaction explains why, in urban areas, ground-level ozone concentrations drop at night, while aloft and in downwind rural areas (without sources of fresh NO emissions), ozone concentrations can remain relatively high.

New ambient air quality standards for NO_2 may become law in late 2007. Although the attainment designations have not yet been established for the new, more stringent standards, in 2006 the entire state attained the NO_2 standards. Background airborne conditions of NO_2 in the project area (measured in Fremont) have been approximately 0.015 ppm annually, or 28 $\mu g/m^3$ over the past three years. The BAAQMD appears likely to attain the proposed standards because the highest background NO_2 concentrations are approximately 50 percent of the new standards (ARB 2007).

Sulfur Dioxide

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. When high levels are present in ambient air, SO_2 leads to sulfite particulate formation and acid rain. Natural gas contains very little sulfur and so therefore results in very little SO_2 emissions when burned. By contrast, high sulfur fuels like coal emit large amounts of SO_2 when burned. Sources of SO_2 emissions come from every economic sector and include a wide variety of gaseous, liquid, and solid fuels. The entire state is designated attainment for all SO_2 ambient air quality standards.

Summary of Existing Ambient Air Quality

The local and recent ambient air quality data show existing violations of ambient air quality standards for ozone, PM10, and PM2.5. Staff uses the highest local background ambient air concentrations as the baseline in staff's analysis of potential ambient air quality impacts for the proposed Eastshore project. The highest concentrations are shown in **Air Quality Table 7**.

AIR QUALITY Table 7
Highest Local Background Concentrations (μg/m^3)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM10	24 hour	**56.6**	50	**113**
	Annual	20.0	20	100
PM2.5	24 hour	**43.9**	35	**125**
	Annual	9.4	12	78
CO	1 hour	3,680	23,000	16
	8 hour	2,178	10,000	22
NO_2	1 hour	143	470	30
	Annual	28	100	28
SO_2	1 hour	102	655	16
	24 hour	24	105	23
	Annual	8	80	10

Source: AFC Table 8.1-30, updated with ARB 2007.

REGIONAL SETTING

Air Quality Table 8 summarizes the existing regional emission inventory. The existing regional emission inventory includes pollution from a diverse range of stationary sources, mobile sources, and smaller area-wide sources. Mobile sources are commonplace throughout the urban areas of the region, and include about 1.03 million on-road motor vehicles in Alameda County in 2005, heavy mobile equipment used for off-road purposes (e.g., construction equipment), aircraft, and railroad locomotives. Based on this vehicle population, every 1,000 vehicles in Alameda County generate about 23 tons per year of NOx and 6.5 tons per year of PM10 from exhaust and paved road dust.

Alameda County has few existing electric generation sources; therefore this source category is relatively small when compared with the combined manufacturing and industrial category and with mobile sources of on-road motor vehicles and off-road equipment.

AIR QUALITY Table 8
Alameda County, Existing Emissions from Selected Source Categories
Annual Average 2005 (tons per day)

Emission Inventory Category	NOx	POC	PM10	PM2.5	CO	SOx
Electric Utilities	0.20	0.01	0.01	0.01	0.1	0.01
Manufacturing and Industrial	3.66	0.10	0.17	0.17	1.0	0.47
Residential Fuel Combustion	3.88	1.94	4.31	4.16	32.7	0.11
Farming Operations	---	0.88	2.04	1.20	---	---
Construction And Demolition	---	---	10.16	2.11	---	---
Paved Road Dust	---	---	16.75	2.83	---	---
Unpaved Road Dust	---	---	0.58	0.12	---	---
Fugitive Windblown Dust	---	---	0.46	0.10	---	---
On-Road Motor Vehicles	64.89	31.71	2.04	1.41	302.4	0.57
Off-Road Equipment	21.16	7.55	1.56	1.40	76.5	0.06
Grand Total for Alameda County	**132.9**	**81.5**	**44.6**	**18.3**	**440.3**	**4.34**

Source: ARB, Almanac Emission Projection Data (http://www.arb.ca.gov/app/emsinv/emssumcat.php). Accessed May 24, 2007.

Air Quality Table 9 shows the contribution of regional emissions caused by residential fuel combustion. These are categorized as area sources because space heating, water heating, cooking, and fireplaces are both numerous and distributed area wide.

AIR QUALITY Table 9
Alameda County, Emissions from Residential Fuel Combustion
Annual Average 2005 (tons per day)

Emission Inventory Category	NOx	POC	PM10	PM2.5	CO	SOx
Wood Combustion - Wood Stoves	0.05	0.23	0.41	0.40	3.11	0.01
Wood Combustion – Fireplaces	0.29	1.50	3.57	3.44	27.89	0.04
Natural Gas Combustion - Space Heating	2.24	0.11	0.18	0.18	0.92	0.01
Natural Gas Combustion - Water Heating	0.86	0.07	0.12	0.12	0.62	0.01
Natural Gas Combustion - Cooking	0.16	0.01	0.01	0.01	0.07	0.00
Residential Fuel Combustion (Alameda County, Total)	**3.88**	**1.94**	**4.31**	**4.16**	**32.7**	**0.11**

Source: ARB, Almanac Emission Projection Data (http://www.arb.ca.gov/app/emsinv/emssumcat.php). Accessed May 24, 2007.

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The Eastshore project would include the following stationary sources of emissions:

- Fourteen natural gas-fired reciprocating internal combustion engine-generator sets, each 8.4 MW (gross), 11,660 bhp, Wärtsilä model 20V34SG, with each engine abated by a selective catalytic reduction (SCR) system and oxidation catalyst. These engines would be limited to no more than 4,000 operating hours per year;
- one nominal 225 kilowatt (kW) Caterpillar model C9 ATAAC, diesel fuel oil-fired emergency engine-generator set (i.e., “black start” engine), 369 bhp that would be U.S. EPA Tier 3 certified. This emergency generator would use ARB ultra-low-sulfur (0.0015 percent or 15 ppm sulfur by weight) diesel fuel; and

- one natural gas-fired heater to heat natural gas fuel delivered to the reciprocating engines to 25°F above the dew point of the gas, with a maximum firing rate of 2.0 million British thermal units (Btu) per hour (MMBtu/hr) heat input.

Separate emissions caused during the construction phase, initial commissioning, and operation are described here.

Proposed Construction Emissions

Construction of Eastshore is expected to take about 18 months. Its four main phases are:

- site preparation, including demolition of the existing structure;
- foundation work;
- construction and installation of major structures and equipment; and
- start-up and testing of the equipment.

During the construction period, air emissions would be generated from the exhaust of heavy equipment and fugitive dust from activity on unpaved surfaces. Site development would require minimal grading or earthmoving activities because both the site and the temporary construction laydown and parking areas across Clawiter Road are essentially flat. Construction activities would be limited to a 10-hour day (as in the applicant's response to Data Request 14 [DR14]). Fugitive dust emissions would result from:

- demolition to remove existing structures and pavement;
- dust entrained during site preparation, grading, and excavation at the construction site;
- dust entrained during travel on paved and unpaved surfaces on site and at the temporary construction laydown and parking areas;
- dust entrained during aggregate and soil loading and unloading operations; and
- wind erosion of areas disturbed during construction activities.

Combustion emissions during construction would result from:

- exhaust from diesel construction equipment used on site for site preparation, grading, excavation, and construction of on-site structures;
- exhaust from water trucks used on site to control construction dust emissions;
- exhaust from diesel-powered equipment used on site such as welding machines, electric generators, air compressors, and water pumps;
- exhaust from pickup trucks and diesel trucks used on site to transport workers and materials around the construction site;
- off-site exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and
- Off-site exhaust from automobiles used by workers commuting to the construction site.

Estimates for Eastshore's highest daily emissions and total annual emissions for the entire 18-month construction period are shown in **Air Quality Table 10**.

AIR QUALITY Table 10
Eastshore, Estimated Maximum Construction Emissions

Activity	NOx	POC	PM10	PM2.5	CO	SOx
On-site Fugitive Dust (lb/day)	---	---	9.1	1.8	---	---
On-site Equipment Exhaust (lb/day)	230.4	28.6	16.0	14.7	112.6	40.6
Off-site (On-road) Exhaust (lb/day)	13.9	5.4	0.4	0.41	48.1	0.04
Off-site Paved Road Dust (lb/day)	---	---	5.0	0.04	---	---
Total Maximum Daily Emissions (lb/day)	**244.3**	**34.0**	**30.5**	**17.0**	**160.7**	**40.6**
On-site Fugitive Dust (tons per year, tpy)	---	---	0.46	0.10	---	---
On-site Equipment Exhaust (tpy)	16.1	2.14	1.16	1.06	8.31	2.78
Off-site (On-road) Exhaust (tpy)	1.6	0.65	0.05	0.05	5.77	0.01
Off-site Paved Road Dust (tpy)	---	---	0.60	0.08	---	---
Total Annual Emissions (tpy)	**17.7**	**2.78**	**2.26**	**1.29**	**14.1**	**2.79**

Source: AFC Appendix 8.1E, Table 8.1E-1, with DR14.

The applicant proposes to reduce construction emissions by implementing best management practices that are consistent with local air district recommendations, soil erosion control requirements, and nuisance prohibitions. The applicant proposes to implement the following measures to control exhaust emissions from the diesel heavy equipment used for construction (AFC Appendix 8.1E.2):

- operational measures, such as limiting engine idling time by shutting down equipment when not in use;
- regular preventive maintenance to preclude emission increases from engine problems;
- use of low sulfur and low aromatic fuel that meets California standards for motor vehicle diesel fuel; and
- use of low-emitting gas and diesel engines that meet state and federal emissions standards (Tier I and II) for construction equipment including, but not limited to, catalytic converter systems and particulate filter systems.

The applicant proposes to implement the following mitigation measures to control fugitive dust emissions during construction (AFC Appendix 8.1E.2):

- use of water application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- use of periodic vacuum sweeping and/or water flushing of paved road surfaces to remove the buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- either covering all trucks hauling soil, sand, and other loose materials, and/or requiring them to maintain at least two feet of freeboard;

- limiting traffic speeds on all unpaved site areas to 5 mph;
- installing sandbags or other erosion control measures to prevent silt runoff to roadways;
- replanting vegetation in disturbed areas as quickly as possible;
- use of wheel washers or washing off tires of all trucks exiting construction site; and
- mitigating fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by applying either water or chemical dust suppressants.

Proposed Initial Commissioning Emissions

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

The BAAQMD allows up to 300 hours of operation per engine without full emissions controls, limited to discrete commissioning activities that can only be properly executed without full operation of the SCR or oxidation catalyst systems (BAAQMD 2007a). The applicant expects a commissioning duration of 50 to 80 operating hours per engine and provides estimates of worst-case commissioning emissions based upon the operation at four load points (100 percent, 90 percent, 75 percent, and 50 percent) without emission controls (AFC Section 8.1.8.4).

Air Quality Table 11 presents the predicted maximum short-term emissions of NOx, CO, and POC. PM10, PM2.5, and SO_2 emissions are not included here since they are proportional to fuel use, and fuel use during commissioning is equal to that during full load operations.

AIR QUALITY Table 11
Eastshore, Maximum Initial Commissioning Emissions

Source	NOx	POC	CO
Each Internal Combustion Engine (lb/hr)	33.1	16.2	67.1
Fourteen Internal Combustion Engines (lb/day)	3,058.4	975.1	4,033.5

Source: AFC Appendix 8.1A-6 and BAAQMD 2007a.

Operation Emission Controls

NOx Controls

Exhaust from each engine will be treated by a SCR system before being released into the atmosphere. SCR refers to a process that chemically reduces NOx to elemental nitrogen and water vapor by injecting ammonia (NH_3) into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient

conversion of NOx to nitrogen and water vapor requires the uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

POC and CO Controls

Engine emissions of CO and unburned hydrocarbons, including POC, will be controlled with an oxidation catalyst installed in conjunction with the SCR catalyst. An oxidation catalyst system chemically reacts with organic compounds and CO with excess oxygen to form carbon dioxide (CO_2) and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals.

PM10/PM2.5 and SOx Controls

The exclusive use of pipeline-quality natural gas, a clean-burning fuel that contains very little sulfur or noncombustible solid residue, will limit the formation of SOx and particulate matter. Natural gas does contain small amounts of a sulfur-based scenting compound known as mercaptan, which results in some SOx emissions when burned. However, in comparison with other fuels used in thermal power plants, such as fuel oil or coal, SOx emissions from natural gas are very low. Particulate matter emissions from natural gas combustion are also very low compared with other fuels. The applicant and the BAAQMD both expect the average natural gas sulfur content to be less than 0.20 grains per 100 cubic feet at standard temperature and pressure (gr/100 scf).

Proposed Operation Emissions

Emissions of criteria pollutants would be generated from operating major project components. **Air Quality Tables 10** through **12** summarize the maximum (worst-case) estimated emissions associated with the Eastshore project's operation. Emissions for each of the 14 11,660 bhp Wärtsilä 20V34SG reciprocating internal combustion engines are based upon:

- NOx emissions controlled to 5 parts per million by volume, dry basis (ppmvd) corrected to 15 percent oxygen, averaged over any 1-hour period;
- POC emissions controlled to 25 ppmvd at 15 percent O_2 for any 1-hour period;
- CO emissions controlled to 13 ppmvd at 15 percent O_2 for any 1-hour period;
- ammonia slip (NH_3) controlled to 10 ppmvd at 15 percent O_2 for any 3-hour period;
- PM10 emissions limited to 1.3 lb/hr on a 24-hour and annual basis but up to 1.9 lb/hr per engine, subject to approval by the BAAQMD Air Pollution Control Officer that the specific engine has been installed, operated, and maintained properly (**AQ-16**, BAAQMD 2007a);
- SOx emissions limited to 0.24 lb/hr;
- exclusive use of pipeline-quality natural gas fuel with no provisions for an alternative or backup fuel;
- operation permitted up to 4,000 hours annually for each engine, which is equivalent to an annual capacity factor of approximately 45 percent; and

- start-ups and shutdowns limited to no more than 300 start-ups (0.5 hr per event) and 300 shutdowns (8.5 minutes per event) for each engine per year.

Emissions from the 369 bhp emergency standby generator engine are based upon:

- NOx emissions limited to 2.62 grams per horsepower-hour (g/bhp-hr);
- POC emissions limited to 0.14 g/bhp-hr;
- CO emissions limited to 2.31 g/bhp-hr;
- PM10 emissions limited to 0.11 g/bhp-hr;
- exclusive use of ARB ultra-low-sulfur diesel fuel; and
- operation permitted up to one hour per day and not more than 50 hours per year for maintenance and testing purposes.

Emissions from the natural gas-fired fuel-gas heater are based upon a maximum firing rate of 2.0 MMBtu/hr, which ensures exempt emissions per BAAQMD Rule 2-1-114.

Air Quality Table 12 lists the maximum 1-hour emissions from each piece of proposed equipment from manufacturer estimates and limits in the Final Determination of Compliance (BAAQMD 2007a).

AIR QUALITY Table 12
Eastshore, Maximum Short-Term Emissions Rates (pounds per hour [lb/hr])

Source	NOx	POC	PM10/ PM2.5	CO	SO_2
Each Internal Combustion Engine (lb per 30-minute start-up event)	8.82	6.61	2.43	13.23	0.12
Each Internal Combustion Engine (lb per 8.5 minute shutdown event)	0.19	0.33	0.27	0.30	0.03
Each Internal Combustion Engine (maximum lb per normal hour)	1.33	2.31	1.9	2.10	0.24
Fourteen Internal Combustion Engines (maximum lb per start-up hour)	132.8	108.8	47.3	199.9	3.3
Emergency Standby Generator	2.13	0.11	0.09	1.88	0.004

Source: BAAQMD 2007a.

Air Quality Table 13 lists the worst-case emissions during any given day of operation of the proposed Eastshore project. These emissions are based upon one cold start-up of each internal combustion engine, followed by 23.5 hours of normal operation. The emergency standby generator shown assumes 24 hours of emissions (BAAQMD 2007a), though this unit is actually not expected to operate for more than one hour at a time for maintenance and testing or to bring the facility into operation during black start conditions (AFC Section 8.1.2.3).

AIR QUALITY Table 13
Eastshore, Maximum Daily Emissions (lb/day and tons per day)

Source	NOx	POC	PM10/ PM2.5	CO	SO_2
Each Internal Combustion Engine (lb/day)	40.0	60.9	47.1	62.6	5.7
14 Internal Combustion Engines (lb/day)	560.3	852.2	461.7	876.5	79.5
Emergency Standby Generator (lb/day)	51.2	2.7	2.2	45.1	0.11
14 Internal Combustion Engines (tons per day)	0.28	0.43	0.23	0.44	0.04

Source: BAAQMD 2007a, with worst-case scenario emergency generator engine operating 24 hr/day.

Air Quality Table 14 lists maximum potential annual emissions from each source with the federally enforceable total annual emission limits for the proposed project (**AQ-13**) (BAAQMD 2007a). The permit conditions make the limit on total annual emissions consistent with the applicant's proposal to not exceed 4,000 hours of operation and 300 start-ups and shutdowns annually for each engine.

AIR QUALITY Table 14
Eastshore, Maximum Annual Emissions (tons per year [tpy])

Source	NOx	POC	PM10/ PM2.5	CO	SO_2
Each Internal Combustion Engine	3.88	5.44	4.60	6.02	0.47
Fourteen Internal Combustion Engines	54.3	76.1	40.3	84.4	6.6
Emergency Standby Generator	0.05	0.003	0.002	0.05	< 0.01
Total Maximum Annual Emissions	**54.4**	**76.1**	**40.3**	**84.5**	**6.6**

Source: BAAQMD 2007a.

Ammonia Emissions

Ammonia is injected into the flue gas stream as part of the SCR system that controls NOx emissions. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip. It should be noted that a maximum permitted ammonia slip rate only occurs after considerable degradation of the SCR catalyst, usually five years or more after beginning operations. At that point, the SCR catalysts are removed and replaced with new catalysts. During the majority of the operational life of the SCR system, actual ammonia slip will be between 10 and 50 percent of the permitted limit.

The Eastshore project applicant initially proposed to limit ammonia slip emissions to 20 ppmvd, a level that could result in nearly 55 tons per year NH_3. In the California Air Resources Board's (ARB) *Guidance for the Permitting of Electrical Generation Technologies* (pg. 31 of July 2002 edition), ARB recommends that lean-burn internal combustion engines under 50 MW be controlled to reduce ammonia slip to 10 ppmvd, which staff considers to be achievable. Consistent with these ARB recommendations, the BAAQMD Final Determination of Compliance requires that Eastshore achieve an

ammonia slip level of 10 ppmvd (**AQ-14**) (BAAQMD 2007a), which is a permitted limit of 27.5 tons per year NH_3.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

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

Dispersion models complete complex, repeated calculations that consider emissions in the context of various ambient meteorological conditions, local terrain, and the built environment. For the Eastshore project, the meteorological data used as an input to the dispersion model included five years (1990-1994) of hourly wind speeds and directions measured at the Union City meteorological station, combined with upper-air meteorological data for coastal northern California from Oakland.

The applicant used the U.S. EPA's Industrial Source Complex Short Term Model (ISCST3, version 02035) as both a screening and refined model to estimate the direct impacts of the project's NOx, PM10, CO, and SOx construction and operations emissions. The project-related modeled concentrations are then added to highest background concentrations to arrive at the total impact of the project. The total impact is then compared with the ambient air quality standards for each pollutant to determine whether the project's emissions would either cause a new violation of the ambient air quality standards or contribute to an existing violation.

Construction Impacts and Mitigation

This section discusses the project's short-term direct construction ambient air quality impacts assessed by the applicant and, as necessary, independently assessed by Energy Commission staff. The applicant estimated the emissions of the main site construction activities and modeled the impacts using the ISCST3 model for all pollutants except NO_2, which was modeled with the Ozone Limited Method (ISC3-OLM) Ambient Ratio Method (ARM). The applicant estimated various construction sources using 44 surrogate point sources with separate area sources for fugitive dust from both the site and construction laydown areas.

Air Quality Table 15 summarizes the results of the modeling analysis for construction activities. The total impact is the sum of the existing background condition plus the maximum impact predicted by the modeling analysis for project activity. The values in **bold** in the Impact and Background columns represent the values that either equal or exceed the relevant ambient air quality standard.

The maximum modeled project construction impacts are predicted to occur at the eastern fence line (Life Chiropractic College) and decrease rapidly with distance. The highest PM10 and PM2.5 impacts predicted for the southern fence line (Fremont Bank's Operations Center) would be about two-thirds of the overall maximum modeled impact. No residential receptors exist at the fence line, but the maximum daily PM10 and PM2.5 construction impacts would be about one-third of the maximum levels at the nearest residence, some 1,100 feet northeast of the site. At Ochoa Middle School and Eden Gardens Elementary School, approximately 3,000 and 3,500 feet away, respectively, the maximum daily PM10 and PM2.5 impacts would be about one-fifth of the maximum levels.

AIR QUALITY Table 15
Eastshore, Construction-Phase Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	36.3	**56.6**	**92.9**	50	**186**
	Annual	5.3	20.0	**25.3**	20	**127**
PM2.5	24 hour	13.4	**43.9**	**57.3**	35	**164**
	Annual	2.4	9.4	11.8	12	98
CO	1 hour	177.5	3,680	3,858	23,000	17
	8 hour	122.6	2,178	2,301	10,000	23
NO_2	1 hour	267.6	143	410.6	470	87
	Annual	16.6	28	44.6	100	45
SO_2	1 hour	64.0	102	166	655	25
	24 hour	19.4	24	43	105	41
	Annual	3.8	8	12	80	15

Sources: AFC Table 8.1E-2 for NO2 (using OLM and ARM), CO, and SO2; DR14 for PM10; and for PM2.5, DR14 with Energy Commission staff calculations based on 100% of combustion particulate matter impact (24-hour = 7.7 µg/m^3) plus 20% of fugitive dust particulate matter impact (24-hour = 0.2 x 28.6 µg/m^3) (SCAQMD 2006).

Staff believes that particulate matter emissions from construction would cause a significant impact because they will contribute to existing violations of annual and 24-hour average PM10 and PM2.5 ambient air quality standards, and additionally that

those emissions can and should be mitigated to a level of insignificance. Significant secondary impacts would also occur for PM10, PM2.5, and ozone because construction-phase emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and POC) would also contribute to existing violations of these standards. The direct impacts of NO_2, in conjunction with worst-case background conditions, would not create a new violation of the 1-hour or annual NO_2 ambient air quality standard. The direct impacts of CO and SO_2 would not be significant because construction of the project would neither cause nor contribute to a violation of these standards. Mitigation for construction emissions of PM10, PM2.5, SOx, NOx, and POC would be appropriate for reducing impacts to PM10, PM2.5, and ozone.

Construction Mitigation

The applicant proposes implementation of a number of control measures to reduce emissions of particulate matter, particulate matter precursors, and ozone precursors in a manner consistent with local air district recommendations, soil erosion control requirements, and nuisance prohibitions. Staff agrees that the applicant's proposed mitigation measures would be effective. However, staff recommends additional construction mitigation measures.

Additional measures recommended by staff would reduce construction-phase impacts to a less than significant level by further reducing construction emissions of particulate matter and combustion contaminants. Staff believes that the short-term and variable nature of construction activities warrants a qualitative approach to mitigation. Construction emissions and the effectiveness of mitigation varies widely depending on variable levels of activity, the specific work taking place, the specific equipment, soil conditions, weather conditions, and other factors, making precise quantification difficult. Despite this variability, there are a number of feasible control measures that can be implemented to significantly reduce construction emissions. Staff has determined that the use of oxidizing soot filters is a viable emissions control technology for all heavy diesel-powered construction equipment that does not use an ARB-certified low emission diesel engine. In addition, staff proposes that, prior to beginning construction, the applicant should provide an Air Quality Construction Mitigation Plan (AQCMP) that specifically identifies mitigation measures to be employed by the applicant to limit air quality impacts during construction. Staff includes proposed staff Conditions of Certification **AQ-SC1** through **AQ-SC5** to implement these requirements. These conditions are consistent with both the applicant's proposed mitigation and the conditions of certification adopted in similar prior licensing cases. Compliance with these conditions would substantially eliminate the potential for significant air quality impacts during construction of the Eastshore project.

Operation Impacts and Mitigation

The following section discusses ambient air quality impacts that were estimated by the applicant and subsequently evaluated by Energy Commission staff. The applicant performed a number of direct impact modeling analyses, including both fumigation modeling and modeling for impacts during commissioning.

Routine Operation Impacts

A refined dispersion modeling analysis was performed to identify off-site criteria pollutant impacts that would occur from routine operational emissions throughout the life of the project. This impact analysis includes both maximum operating and start-up/shutdown scenarios to determine worst-case air quality impacts on both a short-term and an annual basis. The operating profiles are shown in **Air Quality Table 12** to **14**. The predicted maximum concentrations of non-reactive pollutants are summarized in **Air Quality Table 16**.

AIR QUALITY Table 16
Eastshore, Routine Operation Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	27.5	**56.6**	**84.1**	50	**168**
	Annual	3.1	20.0	**23.1**	20	**116**
PM2.5	24 hour	17.0	**43.9**	**60.9**	35	**174**
	Annual	3.1	9.4	**12.5**	12	**104**
CO	1 hour	454.5	3,680	4,135	23,000	18
	8 hour	374.3	2,178	2,552	10,000	26
NO_2	1 hour	314.3	143	457.3	470	97
	Annual	3.2	28	31.2	100	31
SO_2	1 hour	7.4	102	109.4	655	17
	24 hour	4.8	24	28.8	105	27
	Annual	0.5	8	8.5	80	11

Source: AFC Table 8.1-34 and Table WKS 4-5 (May 4, 2007; with PM10/PM2.5 revised by staff). PM2.5 is 3-year average of maximum 8th highest (for 98th percentile) 24-hour impact. Includes routine start-up and shutdown events per AFC Table 8.1B-2.

Maximum modeled impacts are predicted to occur directly across Clawiter Road (Life Chiropractic College). The highest PM10 impacts predicted for the fence line with Fremont Bank's Operations Center would be about two-thirds of the overall maximum modeled impact (or 18 µg/m^3) at the eastern end and less than one-third (or under 9 µg/m^3) at the western end of the property boundary. At the closest residential receptor, the maximum modeled PM10 and PM2.5 concentrations will be somewhat lower than those shown in **Air Quality Table 16**. The maximum daily PM10 and PM2.5 impacts caused by routine project operation would be under 10 µg/m^3 at the nearest residence, some 1,100 feet northeast of the site. At Ochoa Middle School and Eden Gardens Elementary School, approximately 3,000 and 3,500 feet away, respectively, the maximum daily PM10 and PM2.5 impacts would be between 4 and 8 µg/m^3.

Staff believes that particulate matter emissions from the project's routine operation would cause a significant impact because those emissions would contribute to existing violations of PM10 and PM2.5 ambient air quality standards. The particulate matter emissions can and should be mitigated to a level of insignificance. Significant secondary impacts would also occur for PM10, PM2.5, and ozone due to emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and POC) that would also contribute to existing violations of these standards. The direct impacts of NO_2, in conjunction with the worst-case background conditions, would not create a new violation of the 1-hour or annual NO_2 ambient air quality standard. Project-related CO and SO_2 would not be significant because routine operation would neither cause nor contribute to

a violation of these standards. Mitigation for the emissions of PM10, PM2.5, SOx, NOx, and POC during routine operation is required for reducing impacts to PM10, PM2.5, and ozone.

Mitigation for Routine Operation

Mitigation for Ozone

Air quality impacts from Eastshore to regional ozone levels will be reduced both by using emission control equipment on the sources and by providing emission offsets. The SCR system and oxidation catalyst would reduce NOx emissions and emissions of POC to levels that would be consistent with Best Available Control Technology requirements, but offsets would still be required to meet BAAQMD rules that manage impacts to ozone.

Applicant-Proposed Ozone Mitigation. The applicant has identified, but not secured, sufficient Emission Reduction Credits (ERCs) to satisfy the BAAQMD requirements for regional ozone management. The applicant proposes to surrender POC emission reduction credits for all of the ozone precursor requirements, as allowed by BAAQMD Rule 2-2-302.2 (BAAQMD 2007a). The BAAQMD does not consider the location of the emission reduction when evaluating ERC adequacy for offsets. This is because ozone creation is a regional phenomenon and decreases in one area of the region are effective in offsetting increases in other areas (BAAQMD 2007a). The ERCs that Eastshore proposes to use to offset its increases are identified in **Air Quality Table 18**. To ensure that sufficient credits have been secured to satisfy the BAAQMD ozone management requirements prior to construction, staff recommends Condition of Certification **AQ-SC6**.

AIR QUALITY Table 18
Eastshore, Proposed Offsets for Ozone (tons per year [tpy])

Emission Reduction Certificate Number, Location	NOx	POC
823, Crown Cork & Seal Company, Union City	---	71.000
1015, Koch Supply and Trading LP, Fremont	---	22.778
1016, Koch Supply and Trading LP, Fremont	---	15.518
1017, Koch Supply and Trading LP, San Leandro	---	4.4
1022, Koch Supply and Trading LP, Cupertino	---	19.718
1019, Koch Supply & Trading LP, Milpitas	---	15.856
1006, Koch Supply and Trading LP, Union City	---	23.4
Total ERCs Identified	---	172.67
Total Offsets Required by BAAQMD	150.036	

Source: BAAQMD 2007a.

Eastshore would be permitted to operate in a peaking mode, which causes higher-than-average emissions during periods of high demand for electricity. Peak daily allowable ozone precursor emissions of 1,413 lb/day (560.3 lb/day NOx plus 852.2 lb/day POC shown in **Air Quality Table 13**) would be offset by the ERCs that provide 150.036 tons of reductions over 12 months. Total offsets required by BAAQMD amount to an average of 12.5 tons per month, or about 830 lb/day. Over the life of the facility, Eastshore expects to operate about 200 hours per typical month during the ozone season with 25 startups per month(AFC Appendix Table 8.1A-13). The expected operating profile would

cause about 8 tons of ozone precursors per month. This would be roughly 800 lb/day, if the plant is called to operate for 10 hours per day over 20 days of the month,[3] well below the peak daily allowable emission rate.

The ability of Eastshore to start quickly and reach operating capacity within 30 minutes minimizes the variability of emissions that can typically occur when operating in a peaking mode. Daily emissions and partial load operation would also be minimized by the incremental operation of the facility as each of its fourteen engines would be individually dispatched. Under the foreseeable operating profile, ozone precursor emissions would be fully mitigated by the BAAQMD offsets.

Mitigation for PM10/PM2.5

Eastshore is not required by BAAQMD rules to offset PM10 or SOx emission increases. Only sources emitting more than 100 tpy of PM10 or SOx must surrender offsets under the BAAQMD requirements (Rule 2-2-303). The applicant recognizes that mitigation would be appropriate during nonattainment periods when project emissions of PM10/PM2.5 and SOx, as a PM precursor, would contribute to background PM10 or PM2.5 concentrations that would exceed the ambient air quality standards. Therefore, in response to staff data requests, the applicant offered to implement an Air Quality Mitigation Plan (May 3, 2007).

Applicant-Proposed PM10/PM2.5 Mitigation. The applicant proposes to use PM10 and/or SO_2 emission reduction credits to mitigate PM10/PM2.5 and SOx emissions expected to occur during every annual 4-month winter period. Based on the emission limits established by the FDOC, about 6.8 tons of PM10/PM2.5 emission reductions and 1.0 tons of SO_2 reductions would be needed to offset the applicant's expected operating profile (schedule of operation) during the 4-month winter PM10/PM2.5 nonattainment season. As an alternative to PM10 ERCs, the applicant also proposes to fund a wood-burning stove and fireplace retrofit program.

To ensure that the project emits no more actual PM10 and SO_2 emissions than the amount mitigated, the applicant proposes to track actual emissions and surrender additional ERCs if emissions exceed reductions already surrendered. The applicant's Air Quality Mitigation Plan (May 3, 2007, updated to reflect the FDOC) proposed the following sample language for a condition of certification:

> **Applicant-Proposed Condition.** *PM10 emissions during the November through February non-attainment season shall not exceed 6.8 tons except as provided below. SO_2 emissions during November through February shall not exceed 1.0 ton except as provided below. Compliance with this condition will be established by use of the most recent BAAQMD-approved source test data, and the average load-based (grams/bhp-hr) PM10 emission rate from all engines tested. Owner shall notify, the CEC CPM within 10 days of exceeding either the PM10 or SO_2 emission limits. Owner shall surrender additional ERCs or other CPM-approved mitigation for any excess emission (equaling the difference between calculated actual emissions and the emission limit) within 60 days of the date that actual emissions exceed an emission limit. Fireplace or wood burning stove retrofits in*

[3] Peaker operation on a typical hot summer day is from about noon to 10 p.m. (CEC 2005).

the BAAQMD may be used to satisfy any additional mitigation requirement and shall be credited using the following factors for each certified unit retrofit: 2 lb PM10/PM2.5 per year per fireplace without insert, 19 lb PM10/PM2.5 per year per fireplace with insert, and 24 lb PM10/PM2.5 per year per woodstove.

The amount of proposed emission reductions is based on the applicant's expectation that the Eastshore project would only run 537 hours per engine over the 4-month period of November through February. This reflects the applicant's expectation that the entire plant would run 1,739 hours per engine per year (**AFC Table 8.1A-13**). However, actual operation could range up to 4,000 hours per engine per year.

Estimates of Eastshore's annual operating profile are necessary to determine a mitigation goal for November through February. Annual allowable PM10/PM2.5 emissions at 4,000 hours per engine would be 40.3 tons per year (**Air Quality Table 14**), but foreseeable annual emissions at the expected 1,739 hours per engine per year would be less than 21 tons per year. Under the applicant's expected operating profile, the emissions would occur more in the months between July and December and less between the months of January and June.

The applicant's offer of 6.8 tons of PM10 mitigation may not adequately offset the impact since the project would be allowed to run without restriction in the winter months. Staff recommends that winter emissions be limited and sufficient reductions be provided to mitigate the PM10 emissions under any operating profile. To mitigate PM10/PM2.5 emissions, staff recommends implementation of the applicant's proposed measure with enough reductions from either the fireplace program or ERCs to ensure that emissions are offset annually. Staff proposes 20.4 tons of year-round PM10/PM2.5 mitigation with additional winter mitigation, if actual winter emissions make it necessary, in Condition of Certification **AQ-SC8**.

The PM10/PM2.5 mitigation would come through a wood burning stove and a fireplace retrofit or replacement program or in the form of ERCs. The BAAQMD issues ERCs for emission reductions occurring on an annual basis, and there is no way to separate out the winter season portion of an ERC. Therefore, to achieve a seasonal (4-month) emission reduction of 6.8 tons with ERCs, 20.4 tons per year of year-round ERCs would need to be surrendered. To ensure that ERCs would be local, the condition requires that the origin of the reductions be either upwind or near Hayward. For wood stove and fireplace retrofits, **Air Quality Table 9** shows that almost 4 tons of PM2.5 per day presently result from wood combustion in Alameda County. Although there appears to be abundant opportunity to reduce these emissions, staff has general concerns with the ability of retrofit programs to produce real and quantifiable reductions. Wood stove and fireplace replacement programs in the Bay Area have produced highly localized and uneven results. To address this, staff recommends Condition of Certification **AQ-SC8**, which would require that retrofits and targeted emission reductions be achieved before Eastshore begins commissioning activities.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, POC, and ammonia are precursor pollutants that can contribute to the formation of secondary pollutants, ozone, PM10, and PM2.5. The process of gas-to-particulate conversion is complex and depends on

many factors, including local humidity and the presence of other compounds. Currently, there are no agency-recommended models or procedures for estimating ozone or particulate nitrate or sulfate formation from a single project. However, because of the known relationships of NOx and POC to ozone and of NOx, SO_2, and ammonia emissions to secondary PM10 and PM2.5 formation, it can be said that unmitigated emissions of these pollutants would contribute to higher ozone and PM10/PM2.5 levels in the region. Significant impacts of NOx and POC to ozone concentrations would be mitigated with BAAQMD offsets, as described above (**AQ-SC6**).

Ammonia is a particulate precursor but not a criteria pollutant. Reactive with sulfur and nitrogen compounds, ammonia is common in the atmosphere primarily from natural sources or as a byproduct of tailpipe controls on motor vehicles. Ammonia particulate forms more readily with sulfates than with nitrates. Because SOx is not as common as NOx in ambient air, it can be a limiting factor in the formation of ammonium sulfate. For this reason, limiting SOx emissions also limits the formation of particulate sulfates. The formation of particulate nitrate is limited by controlling NOx and ammonia emissions to the extent feasible. Since staff considers SOx to be the primary precursor to secondary PM10/PM2.5 formation and the applicant proposes to emit no more than 1.0 ton SO_2 during the winter, staff proposes 3.0 tons per year of SOx mitigation to offset the foreseeable emissions of this regional particulate matter precursor (**AQ-SC8**). Staff recommends allowing inter-pollutant trading of SOx reductions for PM10 increases at a ratio of 5.3-to-1.0, as described in **Air Quality Appendix 1**. Offsetting SOx emissions would both avoid significant secondary particulate impacts and reduce secondary pollutant impacts to a less than significant level.

Fumigation Impacts

There is the potential that higher short-term concentrations of pollutants may occur during fumigation conditions. Fumigation conditions are generally short-term in nature and only compared to 1-hour standards. The applicant analyzed the air quality impacts for worst-case plant start-up emissions under fumigation conditions using the SCREEN3 Model (version 96043) (AFC Section 8.1.8.6 and **Table 8.1-37**). Under fumigation conditions, the short-term project impacts would not exceed the impacts for routine operation shown in **Air Quality Table 16**, above. Therefore, no additional mitigation is required for fumigation impacts.

Commissioning-Phase Impacts

The applicant modeled initial commissioning impacts based upon up to four engines undergoing simultaneous testing. The applicant expects that not all 14 engines will undergo identical commissioning tests simultaneously; multiple engines will be subject to various tests under a schedule that will be finalized during plant construction (AFC Section 8.1.8.4). Up to 300 hours per engine of operation without full emission controls could occur during commissioning. Impacts due to maximum hourly emission rates of PM10, PM2.5, and SO_2 would occur under similar exhaust conditions as start-up modes during routine operation, but PM10/PM2.5 emissions would not be limited to 1.3 lb/hr as they would during routine operation. The commissioning-phase impacts of CO and NO_2 would also be similar to those during routine operations. These commissioning impacts are provided in **Air Quality Table 19**.

AIR QUALITY Table 19
Eastshore, Commissioning-Phase Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	29.6	**56.6**	**86.2**	50	**172**
PM2.5	24 hour	29.6	**43.9**	**73.5**	35	**210**
CO	1 hour	1,047	3,680	4,727	23,000	21
	8 hour	681	2,178	2,859	10,000	29
NO_2	1 hour	313	143	456	470	97

Source: AFC Section 8.1.8.4.

Visibility Impacts

A visibility analysis of a project's gaseous emissions is required under the federal Prevention of Significant Deterioration (PSD) permitting program, as defined in BAAQMD Rule 2-2-417. Eastshore is not subject to PSD requirements because emissions would not exceed the trigger levels (BAAQMD 2007a). The nearest Class I area that could be affected by changes in visibility is Point Reyes National Seashore in western Marin County, at least 60 kilometers from the project site. Due to the distance and emissions below the thresholds requiring analysis, Energy Commission staff anticipates that the project's visibility impacts are insignificant.

Cumulative Impacts and Mitigation

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

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

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

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution;
- an analysis of the project's "localized cumulative impacts" direct emissions locally when combined with other local major emission sources; and
- a discussion of greenhouse gas impacts.

Summary of Projections

The federal and California Clean Air Acts direct local air quality management agencies, in this case, ARB and BAAQMD, to implement plans and programs that lead to attainment and maintenance of the ambient air quality standards. New Source Review programs for permitting new and modified stationary sources, and other programs for reducing emissions from mobile sources or area-wide sources, are part of air quality management plans. ARB compiles region-wide emission forecasts for these groups of sources (as in **Air Quality Tables 8** and **9**).

Ozone

- **Bay Area Ozone Strategy.** The 2005 Ozone Strategy describes how the Bay Area will fulfill California Clean Air Act planning requirements to attain state ozone standards and mitigate ozone transport to downwind air districts. This plan was formerly known as the "Clean Air Plan," and BAAQMD is in the process of updating it this year (2007). The BAAQMD works with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) to assess population, employment, and transportation trends in the region when developing its air pollution control strategies. The Bay Area Ozone Strategy is updated every three years, as required by the California Clean Air Act. The California Clean Air Act does not require a plan to address nonattainment of the state's PM10 or PM2.5 standards, but many of the measures to reduce ozone precursors will also reduce precursors to ambient particulate matter.
- **2001 Ozone Attainment Plan.** This plan was a regional strategy to achieve the federal one-hour ozone standard. Because the federal one-hour ozone standard was subsequently replaced with an eight-hour standard, this plan will be updated as needed to incorporate components of the 2007 Bay Area Ozone Strategy.

The air quality management plans for ozone include projections of the emissions inventory by county and source of emissions. The point source inventory includes over 20,000 different sources, including power plants as follows:

> *The inventory includes emissions from existing and new power plants, including proposed plants that have not yet received permit approval, based on California Energy Commission projections of capacity and demand. The inventory includes substantial increases in generation of electricity at Bay Area power plants. The power production in 2006 is projected to be more than twice the year 2000 levels. Production by existing plants will drop by 20 percent by 2006. That electric demand, plus the projected increases, will be generated by newly constructed plants. Because the new plants are much cleaner and more efficient than the existing plants, overall NOx emissions for this source sector will decrease by 69 percent from 2000 to 2006. (BAAQMD 2001 Ozone Attainment Plan, p. 6.)*

BAAQMD rules and regulations specify performance standards, offset requirements, and emission control requirements for all sources. The regulations also include requirements for obtaining Authority to Construct (ATC) permits and subsequent operating permits. These regulations apply to Eastshore and all projects; they ensure that all projects will be consistent with steps taken to bring the region into attainment. Triennial updates of the attainment plans ensure that population, employment, and

transportation trends in the region are taken into account. Compliance with BAAQMD rules and regulations ensures that projects will be consistent with the regional air quality management plans.

Particulate Matter

The BAAQMD is currently designated as an attainment area for the federal for PM10 and PM2.5 standards, and the California Clean Air Act does not require any local air district to provide a plan for attaining the state PM10 or PM2.5 standards, so there is no adopted implementation plan for particulate matter. However, the air districts and ARB maintain inventories of emissions and projections of particulate matter trends, and particulate matter emissions from all electric generation sources in the BAAQMD are forecasted to increase by at least 51 tons per year between 2006 and 2020 (ARB 2007).

The BAAQMD is likely to become a nonattainment area under federal PM2.5 standards adopted in 2006. If this designation occurs (a decision is scheduled to occur in 2009), the BAAQMD will then be required to prepare attainment plans for ARB and U.S. EPA approval. Direct emissions of PM10 and PM2.5 have been gradually increasing and are projected to increase in the air district, but ambient concentrations have not increased over recent years. Because many of the same sources contribute to both ozone and PM10, future ozone precursor emission controls should help ensure continued particulate matter improvements (ARB 2006a).

In response to state legislation (SB 656), the BAAQMD identified the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM10 and PM2.5. On November 9, 2005, the District issued a final staff report called the Particulate Matter Implementation Schedule. The proposed measures included reducing NOx and POC emissions from internal combustion engines and providing additional outreach and educational resources for eliminating wood burning. Compliance with BAAQMD rules and regulations and implementing mitigation recommended by staff (**AQ-SC8**) ensures that project emissions will not be greater than the forecasted BAAQMD emissions of particulate matter.

Localized Cumulative Impacts

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

Reasonably foreseeable future projects in the area are those that are either currently under construction or in the process of being approved by a local air district or municipality. Projects that have not yet entered the approval process do not normally qualify as “foreseeable” since the detailed information needed to conduct this analysis is not available. Sources that are presently operational are included in the background concentrations. Stationary source projects located up to six miles from the proposed project site usually need to be included in the analysis. Background conditions take into account the effects of non-stationary sources.

The applicant, in conjunction with Energy Commission and BAAQMD staff, identified the following potential new sources (with BAAQMD Facility Numbers) within six miles of the project:

- #15847-Russell City Energy Center (01-AFC-7C), combustion turbines and heat recovery steam generators, cooling tower, and fire pump diesel engine;
- #00698-Georgia Pacific Gypsum emergency generator;
- #16440-Hayward Public Works emergency generator;
- #16451-Hayward Public Works emergency generator;
- #17037-Elder Care Alliance emergency generator;
- #17548-Alameda County natural gas boiler;
- #17553-Rohm & Haas pyrolysis furnace;
- #17553-Rohm & Haas reg. thermal oxidizer;
- #17621-Skywest emergency generator; and
- #18189-Astra Zeneca emergency generator.

The maximum modeled cumulative impacts are presented below in **Air Quality Table 20**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels.

As with impacts from Eastshore alone, maximum cumulative impacts are predicted to occur directly across Clawiter Road (Life Chiropractic College). Cumulative impacts at the closest residences, Ochoa Middle School, and Eden Gardens Elementary School would also be similar to those from Eastshore alone, meaning that impacts from Eastshore dominate the localized cumulative impacts.

AIR QUALITY Table 20
Eastshore, Estimated Localized Cumulative Impacts (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	27.7	**56.6**	**84.3**	50	**169**
	Annual	3.2	20.0	**23.2**	20	**116**
PM2.5	24 hour	17.3	**43.9**	**61.2**	35	**175**
	Annual	3.2	9.4	**12.6**	12	**105**
CO	1 hour	1,254	3,680	4,934	23,000	21
	8 hour	394	2,178	2,572	10,000	26
NO_2	1 hour	316	143	459	470	98
	Annual	3.4	28	31.4	100	31
SO_2	1 hour	9.2	102	111.2	655	17
	24 hour	4.9	24	28.9	105	27
	Annual	0.5	8	8.5	80	11

Source: AFC Table WKS 4-5 (May 4, 2007; with PM10/PM2.5 revised by staff). PM2.5 is 3-year average of maximum 8th highest (for 98th percentile) 24-hour impact. Includes routine start-up and shutdown events per AFC Table 8.1B-2.

Staff believes that project's particulate matter emissions would be cumulatively considerable because they will contribute to existing violations of the PM10 and PM2.5 ambient air quality standards. Secondary impacts would also be cumulatively considerable for PM10, PM2.5, and ozone because emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and POC) would contribute to existing violations of the PM10, PM2.5, and ozone standards.

Both the Eastshore project and the Russell City Energy Center would operate as load-following and peaking units, which involves frequent start-ups and simultaneous operation during the summer peak demand and ozone season. To address the contribution caused by Eastshore to cumulative particulate matter and ozone impacts, Eastshore would need to comply with staff-recommended Conditions.

Greenhouse Gas Emissions

In addition to the criteria air pollutants, the generation of electricity can produce air emissions known as greenhouse gases. Greenhouse gases contribute to the warming of the earth's atmosphere. They include primarily carbon dioxide, nitrous oxide (N_2O), and methane (CH_4, unburned natural gas). Also included are sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) from transformers and chillers.

Climate change from rising temperatures represents a risk to California's economy, public health, and environment (CEC 2003). In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including the need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gas emissions as a condition of the state licensing of new electric generating facilities (CEC 2003, p. 42). This reporting would be in accordance with reporting protocols currently in place or that will be adopted with the implementation of new laws.

The Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has developed standard reporting protocols and methodologies for governments and agencies when calculating GHG inventories. The IPCC-approved methodology for calculating the greenhouse gas emissions in an inventory is specific to the type of fossil fuel burned. In its revised *1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual,* the IPCC established the factors for oxidation, fuel-based emissions, and global warming potential.

The California Global Warming Solutions Act of 2006 (AB32) requires ARB to adopt a statewide greenhouse gas emissions limit equivalent to the statewide GHG emissions levels in 1990, to be achieved by 2020. To achieve this, ARB has a mandate to adopt rules and regulations that will achieve maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted three early-action GHG reduction measures in June 2007 and is expected to establish a statewide emissions cap by January 2008. By January 1, 2008, ARB is scheduled to adopt regulations requiring mandatory GHG emissions reporting, and to define the statewide GHG emissions cap for 2020. The ARB would then adopt a

plan by January 1, 2009, that would indicate how GHG emission reductions would be achieved through regulations, market mechanisms, and other actions. Then, during 2009, ARB staff would draft language to implement its plan and hold public workshops on each of its measures, including market mechanisms (ARB 2006b). Strategies that the state might pursue to manage GHG emissions in California are identified in the California Climate Action Team's report to the Governor (CalEPA 2006). Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are also expected to provide substantial reductions by 2020 (CalEPA, 2006).

The Electricity Greenhouse Gas Emission Standards Act (SB1368[4]) was also enacted in 2006, requiring that generation and contracts be subject to a GHG Environmental Performance Standard. At its January 25, 2007 meeting, the California Public Utilities Commission (CPUC) adopted an Emissions Performance Standard for the state's Investor Owned Utilities of 1,100 pounds (or 0.5 metric tons) CO_2 per megawatt-hour (MWh) of electricity produced. The Emissions Performance Standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or longer, including contracts with power plants located outside of California.[5] A similar performance standard for Publicly Owned Utilities was adopted by the Energy Commission in May 2007.[6] Although the Eastshore project would neither provide base load power nor be subject to the Emissions Performance Standard, it would emit approximately 1,000 pounds of CO_2 per MWh.[7]

Staff recommends Condition of Certification **AQ-SC11**, which requires the project owner to report quantities of relevant emitted greenhouse gases from the Eastshore project. Staff believes that **AQ-SC11**, along with reporting GHG emissions, will make the project consistent with the regulations and policies described above. The greenhouse gas emissions to be reported in Condition of Certification **AQ-SC11** are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, and HFC and PFC emissions that are directly associated with the production and transmission of electricity.

COMPLIANCE WITH LORS

The Eastshore project would conform with applicable federal, state, and local laws and policies as they pertain to the control of criteria pollutant emissions and the mitigation of air quality impacts. If the Energy Commission grants this project a license, and the BAAQMD establishes additional conditions for compliance, Eastshore would be required by **AQ-SC9** and **AQ-SC10** to submit evidence of compliance with those conditions to Energy Commission staff.

[4] Public Utilities Code § 8340 et seq.

[5] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

[6] See CEC Docket # 06-OIR-1, http://www.energy.ca.gov/ghgstandards/documents.

[7] CO_2 per MWh = (71.99 MMBtu/hr)*(31.9 lb C/MMBtu)*(44 lb CO2)/(12 lb C) per 8.4 MW.

FEDERAL

National Ambient Air Quality Standards (NAAQS). The Eastshore project is not subject to the PSD program requirements of an air quality impact analysis or analyses of impacts to soil and vegetation or visibility impairment, but this staff assessment concludes that Eastshore would contribute to existing violations of the ozone and PM2.5 NAAQS. Staff identifies the Conditions of Certification needed to reduce these impacts to a less than significant level.

Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII). The proposed diesel fuel oil-fired emergency engine generator set (i.e., "black start" engine) would conform with this requirement because it would be U.S. EPA Tier 3-certified.

Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40 CFR 60, Proposed Subpart JJJJ). The 14 Wärtsilä 20V34SG natural gas-fired reciprocating internal combustion engine generator sets (11,660 bhp) would conform with this requirement since they would be required to emit no more than approximately: 0.37 g/bhp-hr NOx; 0.56 g/bhp-hr CO; and 0.30 g/bhp-hr POC.

STATE

Public Nuisance Provisions (HSC §41700). Compliance is expected because Eastshore would not be likely to emit visible or odorous air contaminants, and Eastshore is not expected to create a public nuisance, based upon experience with natural gas-fired power plants. The FDOC summarizes how the facility would comply with similar requirements in BAAQMD Reg. 1 (BAAQMD 2007a).

LOCAL

The Final Determination of Compliance (BAAQMD 2007a) summarizes how the proposed Eastshore project would comply with BAAQMD requirements.

New Source Review, Best Available Control Technology. Energy Commission staff provided a comment letter, dated May 25, 2007, to the BAAQMD concerning compliance with BAAQMD Rule 2-2-301. Staff requested a more stringent limit than the 2.2 lb/hr PM10/PM2.5 emission limit in the PDOC in order to conform with ARB's *Guidance for the Permitting of Electrical Generation Technologies*. The October 2007 FDOC established a 1.3 lb/hr limit on a 24-hour and annual basis but allowed up to 1.9 lb/hr per engine, subject to approval by the BAAQMD Air Pollution Control Officer that the specific engine has been installed, operated, and maintained properly (**AQ-16**, BAAQMD 2007a). Staff believes that Eastshore would be likely to comply with the new limit, and the FDOC includes a rigorous and frequent program of stack testing to demonstrate that Eastshore would comply.

FACILITY CLOSURE

Eventually the Eastshore project will close, and all sources of air emissions will cease. Impacts associated with those emissions would also cease. The only other expected emissions would be construction/demolition emissions from dismantling activities. Staff recommends that a facility closure plan be submitted to the Energy Commission

Compliance Project Manager to demonstrate compliance with all local, state and federal rules and regulations during both closure and demolition.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Many public comments were made on the following issues during workshops in January, March, and May 2007, and in writing to Energy Commission staff both prior to the PSA and after release of the PSA.

- **Air quality in Hayward should be tracked with a local monitoring station.** The ARB and BAAQMD operate an ozone monitoring station in Hayward (3466 La Mesa Drive, on the hilltop about five miles east of the site), along with about 20 other stations around the nine-county region. Local particulate matter data are provided by a station in Fremont about 12 miles away. The objective of this routine monitoring network is to aid in regional attainment designations and identify pollution trends. Provisions of Senate Bill 25 (Children's Environmental Health Protection Act, Escutia 1999) required ARB to determine whether the current network adequately reflects the levels of air pollutants that infants and children actually breathe, and it required ARB to perform special monitoring in six communities around the state, including the Fruitvale community in Oakland and Crockett in western Contra Costa County. These locations were selected because children are typically in schools and daycare centers that are near sources of air pollution, including busy highways and industries. The studies found that ozone, PM10, and PM2.5 occur on such widespread levels that localized concentrations can be adequately predicted using near-source models in conjunction with information from the routine monitoring network (ARB 2003). This staff assessment adequately predicts the localized concentrations because it relies upon the highest measured concentrations from the monitoring network and dispersion models specifically designed for determining near-source concentrations.
- **The proposed Wärtsilä 20V34SG engines have never been installed or tested in California.** Eastshore would use 14 natural gas-fired reciprocating internal combustion engine-generator sets. Reciprocating internal combustion engines fired with California pipeline natural gas are well known to California regulators. Although only one percent of the total installed capacity in the state is provided by reciprocating internal combustion engines (CEC 2005), and this particular model of engine would be new in California, many smaller facilities that exist can provide a useful basis from which regulators can draw performance experience (ARB 2002). The proposed engines would use lean-burn combustion (reduces the combustion temperature) and pre-chamber combustion ignition (ignites a portion of the lean air-fuel mixture in a small prechamber above each cylinder) to reduce NOx and ensure complete ignition in the engine cylinder. These engines also include turbo-chargers that improve thermal efficiency. These features are common on stationary internal combustion engines used for electrical generation, and the ability of these technologies to comply with emission limits is well established. Based on experience with similar internal combustion engine installations and source test results provided by the applicant for the Wärtsilä 20V34SG engines in Nevada, Energy Commission staff is confident that the emission limits imposed on Eastshore will be achievable. The BAAQMD shows the results of testing these engines and similar ones in the

FDOC (BAAQMD 2007a). Monitoring and frequent testing requirements in the conditions of certification will assure compliance with these limits over the life of the facility.

- **Using combustion turbines would produce fewer emissions per megawatt output.** Internal combustion engines generate NOx and GHG emissions that are higher per megawatt output than emissions from the rest of California's electrical generation system, but particulate matter emissions from engines are approximately equivalent to system averages (CEC 2005). However, compared with combustion turbines, internal combustion engines operate more efficiently at variable loads. Combustion turbines tend to operate best at one speed. As a load-following and peaking facility, Eastshore is designed to be flexible in its availability. With 14 individual generating units, it could operate at as low as 3.5 percent of facility capacity (one generator at half load), up to 100 percent of facility load, without substantially compromising its efficiency. It would be capable of starting and reaching stable temperatures for emissions control much more quickly than a combustion turbine or combined-cycle facility, which both take more time to generate the heat needed to activate emissions control equipment. This means that the high levels of start-up emissions that normally occur with a combustion turbine are mostly avoided in the Eastshore design.
- **Power plant would operate on "Spare the Air" days.** Eastshore, like any other power plant that contracts with PG&E, needs the flexibility to operate on every day of the year to respond to changes in electricity demand. This air quality impact analysis takes into account worst-case existing conditions, including those days (or episodes) when ozone concentrations are highest. The BAAQMD Ozone Strategy for complying with the standards on worst-case days requires that ozone precursors be offset from new facilities like Eastshore. Curtailing operation of Eastshore on "Spare the Air" days would not be feasible because those days are also likely to coincide with times of hot weather and high electricity demand. Similarly, it would not be feasible to shut down Eastshore or curtail its operation during winter particulate matter episode days. Energy Commission staff recommends mitigation for ozone and particulate matter emissions in **AQ-SC6** and **AQ-SC8**, respectively.
- **Parks, athletic fields, schools, and residences nearby are used by children and people sensitive to air pollution.** All locations outside of the project fence-line are considered to be sensitive. The maximum worst-case air quality impacts for operation of Eastshore and other foreseeable projects are shown in **Air Quality Tables 16** and **20**. The concentrations show impacts before taking into account either the BAAQMD requirements for offsets or staff-recommended mitigation. These impacts based on an assumption that the worst-case meteorological conditions and worst-case level of existing background pollution coincide with the maximum allowed rate of emissions from Eastshore. Staff mitigation measures (**AQ-SC6** and **AQ-SC8**) focus on achieving local reductions. **Public Health** provides more information on the specific health effects of toxic air contaminants.
- **Existing air pollution degrades soil, water, and vegetation.** Emissions of NOx and ammonia contribute to nitric acid deposition that occurs via precipitation and fog, and dry deposition as well. Historically, ARB studies have found that at Fremont the sum of wet and dry deposition rates are roughly 11 percent of the basin-wide NOx emission rates (ARB 1996), or roughly 7 kilograms of total nitrogen per hectare per

year (kg/ha-yr) over 1988 to 1993 levels. Emissions are concentrated in urban areas and are dominated by mobile sources, but deposition occurs more uniformly over a region. Statewide modeling of nitrogen deposition shows that the rates in 2002 were between 4 and 8 kg/ha-yr around Hayward, with the higher levels occurring in the hills east and north of the project site and lower levels occurring along the bayshore (CEC 2007). The total current nitrogen deposition rate to soils, water, and vegetation in the project area is probably around 6 kg/ha-yr today since regional NOx emissions today are less than they were before 2002.

- **Biological resources in the vicinity of the Lake Chabot Regional Park and Garin Regional Park are sensitive to nitrogen deposition from project and cumulative sources.** Eastshore causes a cumulative annual ambient air quality impact at the Lake Chabot Regional Park of approximately 0.27 $\mu g/m^3$ NO_2, and 0.16 $\mu g/m^3$ NO_2 at the Garin Regional Park or less than one percent of the existing 28 $\mu g/m^3$ background NO_2. The ammonia concentration would be about the same order of magnitude. The NO_2 and ammonia from Eastshore could increase total background nitrogen deposition levels in sensitive biological resources. Assuming that all NOx and ammonia emitted by Eastshore and cumulative sources is converted to nitric acid, cumulative nitrogen deposition rates would be between 0.8 to 1.8 kg/ha-yr at sensitive biological resources. These are conservative estimates because only a small fraction of all nitrogen-containing emissions would deposit so close to the project site; airborne nitrogen oxides follow other pathways through conversion to radicals for ozone formation, organic nitrates, or NO_2. **Biological Resources** provides more information and characterizes the project-related impacts to soil and vegetation that could be sensitive to existing air pollution in the area.
- **Secondary particulate matter impacts should be quantified.** The process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of other compounds. There are no agency-recommended models or procedures for estimating particulate nitrate or sulfate formation from individual sources such as Eastshore. Staff seeks full mitigation of SOx (**AQ-SC8**), which is a limiting factor in forming secondary particulate matter.
- **Localized and recent emission reductions should be used as mitigation.** The applicant proposes to use a number of different ERCs to satisfy BAAQMD requirements for offsets (**Air Quality Table 18**). Each reduction must first be certified by the BAAQMD. ERCs are reductions in excess of those required by the current clean air plan or required by current rules and regulations. The reductions are also certified as real, permanent, quantifiable, and enforceable. Because banked ERCs may be traded for and used to offset new emissions at any time, they are currently included in the BAAQMD Ozone Strategy. The ERCs in **Air Quality Table 18** originate from reductions and shutdowns at facilities near the Alameda County bay shoreline, and Energy Commission staff recommends that additional mitigation be in the form of local or upwind ERCs or in pollution reduction programs that would benefit Hayward (**AQ-SC8**). Comments on the PSA expressed concern that local reductions occur. The local ozone precursor ERCs identified by the applicant would need to be surrendered under Condition of Certification **AQ-SC6**. Condition of Certification **AQ-SC8** for particulate matter would only allow the applicant to use local or upwind ERCs. Because staff and the applicant agree that local or upwind ERCs may not be available at any cost, the wood-burning stove and fireplace retrofit

program is probably the most viable option. The applicant prefers to make a good faith effort for local PM10 reductions, but in response to public comments, staff's conditions would mandate that the PM10 reductions be local.

- **Emission Reduction Credits do not provide "real-time" reductions.** The emission inventory that is the basis for ozone attainment assumes new emissions will occur in the future as allowed by ERCs. In the Bay Area, this includes ERCs issued pre-1990, which have values that are adjusted by the BAAQMD to reflect only real and surplus reductions. Surrendering ERCs is a useful mitigation strategy because removing ERCs from the regional bank makes it more difficult for new stationary sources to emit in the Bay Area. This improves the likelihood that actual emissions in the region will remain less than forecasted.

AGENCY COMMENTS ON THE PSA

One agency comment was received on the PSA relative to Air Quality:

Comment 1: City of Hayward (10/9/07). Mitigation of air quality with "credits" for emission reductions enjoyed by some other communities comes at the cost of worsening air quality for residents in Hayward. City staff does not believe that emission reduction credits are an acceptable mitigation, given such ERCs would not mitigate impacts to *local* air quality.

Response: The region-wide air quality management strategy is one of "no net increases." Although some communities may experience local emission increases while other communities experience the reductions, regional improvements are relevant to Hayward because of the shared nature of the air shed. Background particulate matter concentrations in Hayward would decrease with additional control of large stationary sources across the region. Inland reductions also help Hayward especially during the winter season when prevailing wind directions are offshore. To address the City of Hayward's concerns, staff requires local or upwind ERCs, despite requests from the applicant seeking the flexibility to use ERCs from all portions of the air basin. Because of the local or upwind requirement, staff expects the applicant to pursue the fireplace retrofit program as its primary method of project mitigation. Although ERCs from any location will provide a benefit, our recommended mitigation in **AQ-SC8** reflects Hayward's concerns.

PUBLIC COMMENTS ON THE PSA

Public comments made during PSA workshop and specific comments filed in writing to Energy Commission following the PSA workshop include the following additional topics:

Comment 1: Public Workshop (9/6/07). The applicant should be required to monitor emissions of PM10/PM2.5, ambient concentrations of PM10/PM2.5 in the surrounding community, and hospital admissions or incidents of respiratory disease in the community.

Response: The natural gas-fired engines will emit relatively low levels of PM10/PM2.5 when compared to engines burning other fuels, and as noted above, staff is confident that the equipment will comply with the emission limits at all times. To assure

compliance, the Conditions of Certification (**AQ-21** and **AQ-22**) require testing of PM10/PM2.5 frequently, and according to established test methods. Continuous monitoring is normally appropriate when proper operation of a control device must be verified. For the natural gas-fired engines, there would not be any PM10/PM2.5 abatement device to monitor. In-stack continuous emission monitoring systems (CEMS) for particulates were considered but rejected because their technology is evolving and because of the nature of the emissions. Normally, a particulate CEMS would be useful for measuring waste-fired kilns and coal-fired power plants, which emit at higher and more variable particulate loading levels and lower temperature stack conditions than the proposed natural gas-fired engines.

Comment 2: Public Workshop (9/6/07). The applicant should be required to monitor ambient concentrations of PM10/PM2.5 in the surrounding community.

Response: Additional ambient air quality monitoring in the Hayward area has been considered, but is not being recommended by Energy Commission staff or the BAAQMD. The significant impacts shown in **Air Quality Tables 15** and **16** are based on the extremely conservative assumptions that the worst-case meteorological conditions and worst-case level of existing background pollution coincide with emissions at levels equal to the permitted limits. Monitoring stations in the area of the project must capture the effects of both stationary and mobile sources and are located accordingly. Apportionment of the impacts caused by Eastshore would be practically impossible given the background conditions and many other similar sources in the area. The work of BAAQMD and ARB indicate that the localized concentrations shown in **Air Quality Tables 15** and **16** have been adequately predicted.

Comment 3: Public Workshop (9/6/07). The Energy Commission should track hospital admissions or incidents of respiratory disease in the community.

Response: Energy Commission staff does not track hospital admissions or incidents of disease in the community because no measurable change in hospital admissions or incidents of disease are expected to occur with the project. **Public Health** provides more information on the specific potential for respiratory incidents related to Eastshore's emissions.

Comment 4: Robert Sarvey. Staff should recommend denial of the project due to PM10 and PM2.5 impacts that approach the state standard in a populated area, and staff should not rely on seasonal mitigation. The magnitude of the PM10 and PM2.5 impacts is so severe that they cannot be mitigated without changing the equipment of the project. Asthmatics or people with respiratory or heart disease will be severely impacted.

Response: Although **Air Quality Tables 15** and **16** show that the project would cause significant impacts by contributing to existing violations, mitigation is available to reduce the impacts to levels that allow staff to recommend approval of the project without changing the equipment of the project. Existing PM10/PM2.5 violations occur only in the winter (see **Existing Ambient Air Quality**). The staff-recommended mitigation for PM10/PM2.5 would occur at a level and time of year appropriate to address these impacts, and **AQ-SC8** would ensure that reductions are local to the populated area.

Comment 5: Robert Sarvey. Staff should mitigate NOx emissions that lead to formation of secondary PM2.5 and consult with ARB and U.S. EPA regarding use of reductions in POC for ozone management.

Response: Information has been added under the discussion of quantification of secondary particulate matter impacts regarding staff's strategy for PM2.5 mitigation. If the Bay Area is designated as a federal nonattainment area for PM2.5, as seems likely under the new standards (see **Air Quality Figure 2**), the BAAQMD will need to develop a plan for managing PM2.5 within three years of the nonattainment designation. That plan will be subject to ARB and U.S. EPA approval, and it will address how sulfur dioxide, nitrogen oxides, ammonia, and volatile organic compounds relate with each other and the prevailing atmospheric conditions of the Bay Area to form PM2.5. The positive effects of reducing any of these pollutants varies by geographic area. Reductions of either POC or NOx are allowed under the ozone strategy that is part of the BAAQMD SIP, which has been approved by ARB and U.S. EPA. Because POC is also a precursor to fine particulate formation, staff believes that these ERCs help reduce regional and transported particulate matter, and either POC or NOx reductions would be effective for reducing secondary PM2.5. The BAAQMD 2005 Particulate Matter Implementation Schedule supports a strategy of using POC reductions for PM2.5 management (see **Summary of Projections**).

Comment 6: Robert Sarvey. Mitigation in the form of "credits" does not improve real-time conditions in the Bay Area or reduce the impacts experienced by the San Joaquin Valley downwind.

Response: Mitigating the project to avoid a significant impact depends on offsetting project-related emission increases, which can be accomplished with ERCs or other valid reductions. The "real-time" reductions sought by this comment would occur with the wood stove and fireplace replacement program in **AQ-SC8**. Please also see staff's response to the City of Hayward on how the fireplace retrofit program would be implemented locally and the bullet above on how surrendering ERCs avoids new sources.

Comment 7: Fremont Bank (9/24/07). Seeks more detail on air quality impacts to Fremont Bank's Operations Center, and mitigation in the form of "credits" should have to come from the local area that is most impacted by project-related pollution.

Response: The text supporting **Air Quality Tables 15** and **16** includes revisions to identify the impacts at the Fremont Bank property line, and the response to the City of Hayward and other comments provides information on how the fireplace retrofit program would focus the reductions locally.

CONCLUSIONS

- The project would comply with applicable BAAQMD Rules and Regulations, including New Source Review and Best Available Control Technology requirements.

- The project would neither cause new violations of any NO_2, CO, or SO_2 ambient air quality standards nor contribute to existing violations for these pollutants. Therefore, the project's direct NO_2, CO, and SO_2 impacts are less than significant.
- The project NOx and POC emissions would contribute to existing violations of state and federal ozone ambient air quality standards. The ozone precursor offsets required by BAAQMD and shown in Condition of Certification **AQ-SC6** would mitigate the ozone impact to a less than significant level.
- Without proper mitigation, the project PM10 and PM2.5 emissions and the PM10/PM2.5 precursor emissions of SOx would contribute to the existing violations of state and federal PM10 and PM2.5 ambient air quality standards. Based on public comments, only a successful wood stove and fireplace replacement program or local or upwind emission reduction credits would be accepted for PM10 and SO_2 reductions (**AQ-SC8**). These recommendations would mitigate the PM10 and PM2.5 impact to a less than significant level.
- Construction impacts would contribute to violations of the ozone, PM10, and PM2.5 ambient air quality standards. Staff recommends Conditions of Certification **AQ-SC1** to **AQ-SC5** to mitigate the project construction-phase impacts to a less than significant level.
- Staff recommends Condition of Certification **AQ-SC11** to require greenhouse gas reporting.

PROPOSED CONDITIONS OF CERTIFICATION

Staff-Recommended Conditions of Certification

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with conditions **AQ-SC3, AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM delegates. The AQCMM and AQCMM delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the construction project manager (CPM).

Verification: At least 45 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM delegates. The AQCMM and all delegates must be approved by the CPM before the start of ground disturbance.

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

Verification: At least 45 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

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

a. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of **AQ-SC4**. The frequency of watering may be either reduced or eliminated during periods of precipitation.

b. No vehicle shall exceed 10 miles per hour within the construction site.

c. The construction site entrances shall be posted with visible speed limit signs.

d. All construction equipment vehicle tires shall be inspected and washed as necessary to be free of dirt prior to entering paved roadways.

e. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

f. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

g. All construction vehicles shall enter the construction site through the treated entrance roadways unless an alternative route has been submitted to and approved by the CPM.

h. Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.

i. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

j. At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or run-off from the construction site is visible on the public roadways.

k. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered or treated with appropriate dust suppressant compounds.

l. All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks to provide at least two feet of freeboard.

m. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

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

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

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

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

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

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

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

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 100 hp or higher shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. In the event that a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a catalyzed diesel particulate filter (soot filter) unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

   1. There is no available soot filter that has been certified by either the California Air Resources Board or U.S. Environmental Protection Agency for the engine in question; or

   2. The construction equipment is intended to be on site for 10 days or less.

   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not possible.

c. The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that the CPM is informed within 10 working days of the termination:

   1. The use of the soot filter is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

   2. The soot filter is causing or is reasonably expected to cause significant engine damage.

3. The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than five minutes, to the extent practical.

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

AQ-SC6 The project owner shall provide emission reduction credits (ERCs) to offset NOx and POC emissions. The project owner shall demonstrate that NOx and POC emission reduction credits are provided in the form and amount required by the District.

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

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

Emission Reduction Certificate Number, Location	Amount (tpy)	Pollutant
823, Crown Cork & Seal Company, Union City	71.000	POC
1015, Koch Supply and Trading LP, Fremont	22.778	POC
1016, Koch Supply and Trading LP, Fremont	15.518	POC
1017, Koch Supply and Trading LP, San Leandro	4.4	POC
1022, Koch Supply and Trading LP, Cupertino	19.718	POC
1019, Koch Supply & Trading LP, Milpitas	15.856	POC
1006, Koch Supply and Trading LP, Union City	23.4	POC

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

AQ-SC7 Deleted.

AQ-SC8 The project owner shall obtain and surrender emission reduction credits (ERCs) to offset 20.4 tons per year of PM10 emissions and 3.0 tons per year of SO_2 emissions. The emission reduction credits shall originate from sources in the areas of Oakland, Hayward, Fremont, San Jose, and San Francisco.

PM10 emissions during the November 1 through February 28 PM10 nonattainment season shall not exceed 6.8 tons and SO_2 emissions shall not exceed 1.0 tons except as provided below. SO_2 ERCs may be substituted for PM10 ERCs at a ratio of 5.3-to-1.0. Compliance with this condition will be established by use of the most recent District-approved source test data, and the average load-based (grams/bhp-hr) PM10 and SO_2 emission rates from all engines tested.

The project owner shall notify the CPM if the project exceeds the PM10 emission limit in this condition. The owner shall surrender additional ERCs or other CPM-approved mitigation for any excess emission (equaling the difference between calculated actual emissions and the emission limit). Surrendering additional ERCs will establish a new, annual emission limitation equal to 6.8 tons PM10 and 1.0 tons SO_2 plus the quantity of reductions surrendered for November 1 through February 28.

Fireplace or wood burning stove retrofits for Hayward residents may be used to satisfy any additional mitigation requirement and shall be credited using the following factors for each certified unit retrofit: 2 lb PM10/PM2.5 per year per fireplace without insert, 19 lb PM10/PM2.5 per year per fireplace with insert, and 24 lb PM10/PM2.5 per year per wood stove. The program may be made available to all residents in the cities of Fremont, Newark, Union City, San Leandro, Oakland, Emeryville, Albany, Piedmont, Berkeley, Alameda, and the unincorporated areas of Alameda County west of the Oakland/East Bay hills after twelve (12) months from the start date of the fireplace retrofit / woodstove replacement program. The emission reductions from any fireplace or wood-burning stove retrofits must occur in accordance to with the following schedule:

a. achieving 15% of the mitigation (3.1 tons per year) of PM10 within six (6) months after start of construction,

b. achieving 30% of the mitigation (6.2 tons per year) of PM10 within nine (9) months after start of construction.

c. achieving 50% of the mitigation (10.2 tons per year) of PM10 within twelve (12) months after start of construction.

d. achieving 80% of the mitigation (16.3 tons per year) of PM10 within eighteen (18) months after start of construction.

e. achieving 100% of the mitigation (20.4 tons per year) within twenty four (24) months after start of construction.

During the 24-month period following the start of construction, ERCs may also be used to supply additional mitigation.

Verification: The project owner shall submit to the CPM prior to initiating construction evidence of surrendering the emission reduction credits or evidence that sufficient emission reductions from any fireplace or wood stove retrofit program will be achieved in accordance with the specified schedule. The project owner shall notify the CPM within 10 days of exceeding the PM10 emission limit in this condition. The owner shall surrender additional ERCs or other CPM-approved mitigation for any excess emission (equaling the difference between calculated actual emissions and the emission limit) within 60 days of the date that actual emissions exceed the limit in this condition. Quarterly status reports on the program meeting the milestones following the start of construction shall be submitted to the CPM.

AQ-SC9 The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

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

AQ-SC10 The project owner shall comply with all staff (**AQ-SC**) and District (AQ) conditions of certification. The CPM, in consultation with the District, may approve as an insignificant change, any change to an air quality condition of certification, provided that: (1) the project remains in compliance with all applicable laws, ordinances, regulations, and standards; (2) the requested change clearly will not cause the project to result in a significant environmental impact; (3) no additional mitigation or offsets will be required as a result of the change; (4) no existing daily, quarterly, or annual permit limit will be exceeded as a result of the change; and (5) no increase in any daily, quarterly, or annual permit limit will be necessary as a result of the change.

Verification: The project owner shall notify the CPM in writing of any proposed change to a condition of certification pursuant to this condition and shall provide the CPM with any additional information the CPM requests to substantiate the basis for approval.

AQ-SC11 Until the California Global Warming Solutions Act of 2006 (AB32) is implemented, the project owner shall either participate in a greenhouse gas (GHG) registry approved by the CPM, or report on a annual basis to the

CPM the quantity of greenhouse gases emitted as a direct result of facility electricity production.

The project owner shall maintain a record of fuels types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) all fuel burned in internal combustion engines; (2) fuel used in fuel gas heaters and emergency equipment; and (3) all fuels used in any capacity for the purpose of facility startup, shutdown, operation, or emission controls.

The project owner may perform annual source tests of CO_2 and CH_4 emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs CO_2 equivalent per mmBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO_2	EPA Method 3A
CH_4	EPA Method 18 (POC measured as CH_4)

As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen, the project owner shall calculate the CO_2, CH_4 and N_2O emissions using the appropriate fuel-based carbon content coefficient (for CO_2) and the appropriate fuel-based emission factors (for CH_4 and N_2O).

The project owner shall convert the N_2O and CH_4 emissions into CO_2 equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF_6 that is used for replenishing on-site transformers. At the end of each reporting period, the project owner shall total the mass of SF_6 used and convert that to a CO_2 equivalent emission using the IPCC GWP for SF_6. The project owner shall maintain a record of all PFCs and HFCs used for replenishing on-site refrigeration and chillers directly related to electricity production. At the end of each reporting period, the project owner shall total the mass of PFCs and HFCs used and convert that mass to a CO_2 equivalent emission using the IPCC GWP.

On an annual basis, the project owner shall report the CO_2 and CO_2 equivalent emissions from the described emissions of CO_2, N_2O, CH_4, SF_6, PFCs, and HFCs.

Verification: The project annual greenhouse gas emissions shall be reported, as a CO_2 equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM as part of the fourth quarterly operation report (**AQ-SC12**) or the annual

air quality report, until such time that GHG reporting requirements are adopted and in force for the project as part of the California Global Warming Solutions Act of 2006.

AQ-SC12 The project owner shall submit to the CPM quarterly operation reports following the end of each calendar quarter that include operational and emissions information as necessary to demonstrate compliance with the conditions of certification. The quarterly operation report will specifically note or highlight incidences of noncompliance.

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

District-Recommended Conditions of Certification

The following sources would be subject to the proposed conditions of certification.

S-1 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-1 Selective Catalytic Reduction System and A-15 Oxidation Catalyst

S-2 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-2 Selective Catalytic Reduction System and A-16 Oxidation Catalyst

S-3 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-3 Selective Catalytic Reduction System and A-17 Oxidation Catalyst

S-4 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-4 Selective Catalytic Reduction System and A-18 Oxidation Catalyst

S-5 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-5 Selective Catalytic Reduction System and A-19 Oxidation Catalyst

S-6 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-6 Selective Catalytic Reduction System and A-20 Oxidation Catalyst

S-7 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-7 Selective Catalytic Reduction System and A-21 Oxidation Catalyst

S-8 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-8 Selective Catalytic Reduction System and A-22 Oxidation Catalyst

S-9 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-9 Selective Catalytic Reduction System and A-23 Oxidation Catalyst

S-10 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-10 Selective Catalytic Reduction System and A-24 Oxidation Catalyst

S-11 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-11 Selective Catalytic Reduction System and A-25 Oxidation Catalyst

S-12 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-12 Selective Catalytic Reduction System and A-26 Oxidation Catalyst

S-13 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-13 Selective Catalytic Reduction System and A-27 Oxidation Catalyst

S-14 Natural Gas Fired Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wärtsilä Model 20V34SG, abated by A-14 Selective Catalytic Reduction System and A-28 Oxidation Catalyst

S-15 Emergency Standby Generator Set; Diesel Engine; Caterpillar Model C9ATAAC, 369 HP

Conditions for the Engines S-1 through S-14 during the Commissioning Period

AQ-1 The owner/operator of the Eastshore Energy Center (EEC) shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 through S-14 Lean Burn Internal Combustion Engines to the maximum extent possible during the commissioning period.

a. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune each engine S-1 through S-14 after first fire to minimize the emissions of carbon monoxide and nitrogen oxides during commissioning.

b. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate A-1 through A-14, SCR Systems, and A-15 through A-28, Oxidation Catalyst systems, to minimize the emissions during commissioning.

c. The owner/operator of the EEC shall submit a plan to the District Engineering Division and the CEC CPM prior to the firing of any of the engines that shall describe the process to be followed during the commissioning of each engine. 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, engine tuning activities (such as air/fuel ratio settings, engine timing, turbocharger pressure); the installation, tuning, and operation of the SCR systems and oxidation catalysts; the installation, calibration, and testing of the CO and NOx continuous emission monitors; and any activities requiring the firing of the IC engines without abatement by their respective abatement devices. None of the engines shall be fired sooner than 28 days after the District receives the commissioning plan. (Basis: BACT, Offsets)

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

AQ-2 During the commissioning period, the owner/operator of the EEC shall demonstrate compliance with Condition **AQ-6** through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

a. Firing hours for each engine

b. Fuel flow rates to each engine

c. Stack gas nitrogen oxide emission concentrations at P-1 through P-14

d. Stack gas carbon monoxide emission concentrations at P-1 through P-14

e. Stack gas oxygen concentrations at P-1 through P-14

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 engines. The owner/operator shall use District-approved methods to calculate heat input rates, NOx mass emission rates, carbon monoxide mass emission rates, and NOx and CO emission concentrations, summarized for each calendar day. All records shall be retained on site for at least 2 years from the date of entry and made available to District staff upon request. (Basis: BACT, Offsets)

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

AQ-3 The owner/operator shall install, calibrate, and make operational continuous emission monitors for NOx, CO and O2 for each engine prior to first firing of that engine. After first firing of an individual engine, the detection range of the continuous emission monitor for that engine shall be adjusted as necessary to accurately measure the resulting range of CO and NOx emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval. (Basis: BACT, Offsets)

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition. In

addition, the project owner shall provide evidence of the District's approval of the emission monitoring system to the CPM prior to first firing of each engine.

AQ-4 The owner/operator shall operate the facility such that the total number of firing hours of each Engine S-1 through S-14 without abatement of nitrogen oxide and CO emissions by its SCR System and Oxidation Catalyst System shall not exceed 300 hours per engine during the commissioning period. Such operation of S-1 through S-14 without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering Division and Enforcement and Compliance Division and the unused balance of the 300 firing hours per engine without abatement shall expire. (Basis: BACT, Offsets)

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

AQ-5 The owner/operator shall use District approved calculation methods to estimate the total mass emissions of NOx (as NO2), CO, POC, PM10, and SO2 that are emitted by Engines S-1 through S-14 and S-15 during the commissioning and facility startup period. These emissions count towards the consecutive twelve-month emission limitations specified in Condition **AQ-13**. Emission totals shall include emissions during the startup and shutdown of the engines.

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

AQ-6 The owner/operator shall not operate the engines S-1 through S-14 in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the engines S-1 through S-14.

NOx (as NO2) 3058.4 pounds per calendar day
CO 4033.5 pounds per calendar day
POC (as CH4) 975.1 pounds per calendar day
Total Particulate Matter 757.8 pounds per calendar day
PM10 757.8 pounds per calendar day
PM2.5 757.8 pounds per calendar day
SO2 79.53 pounds per calendar day
(Basis: BACT, Offsets)

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

Conditions for the Engines S-1 through S-14 Post-Commissioning Period

AQ-7 The owner/operator shall ensure that S-1 through S-14 IC Engines are fired on PUC natural gas exclusively. (Basis: BACT for PM10, Cumulative Increase for SO2)

Verification: The project owner shall complete, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The sulfur analysis reports shall be incorporated into the quarterly operation reports (**AQ-SC12**).

AQ-8 The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 72.8 MMBtu/hr (HHV, 72.1 MMBtu/hr for Annual Average), averaged over an hour period, including startup/shutdown periods. The owner shall obtain heating value data for the natural gas on a monthly basis from the gas supplier. The heating value data shall be used to calculate a monthly average for heating value that may be used to demonstrate compliance with these conditions. (Basis: BACT, Cumulative Increase)

Verification: Information on the date, time, and duration of any violation of this permit condition shall be incorporated into the quarterly operation reports (**AQ-SC12**).

AQ-9 The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 1730 MMBTU/day per calendar day, including startups/shutdowns. (Basis: Cumulative Increase)

Verification: Information on the date, time, and duration of any violation of this permit condition shall be incorporated into the quarterly operation reports (**AQ-SC12**).

AQ-10 The Owner/operator shall operate each engine such that the heat input rate for all engines S-1 through S-14 combined is less than or equal to 4,036,480 MMBTU/yr on a rolling 12-month average basis, including startups/shutdowns. (Basis: Offsets)

Verification: Information on the date, time, and duration of any violation of this permit condition shall be incorporated into the quarterly operation reports (**AQ-SC12**).

AQ-11 The owner/operator shall limit the total annual operating hours for engines S-1 through S-14 to 56,000 hours. (Basis: Offsets, Cumulative Increase)

Verification: Information on the date, time, and duration of any violation of this permit condition shall be incorporated into the quarterly operation reports (**AQ-SC12**).

AQ-12 The owner/operator shall properly operate and maintain the A-1 to A-14 Selective Catalytic Reduction (SCR) Systems, except as provided during the Commissioning Period, whenever fuel is combusted at the corresponding source S-1 through S-14, respectively, and the individual catalyst bed has reached minimum operating temperature specified by the abatement device manufacturer. The owner/operator shall not inject ammonia into the SCR units (A-1 through A-14) until the catalyst bed reaches the minimum operating temperature specified by the abatement device manufacturer (Basis: BACT for NOx).

Verification: Information on any non-operation of the selective catalytic reduction systems or operation of the ammonia injection prior to the catalyst bed reaching the minimum operating temperature shall be incorporated into the quarterly operation reports (**AQ-SC12**). The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

AQ-13 The owner/operator shall ensure that the cumulative combined emissions from S-1 through S-14 Engines and S-15 do not exceed the following limits during any consecutive twelve-month period, including emissions generated during engine startups and shutdowns:

54.35 tons of NOx (as NO2) per rolling 12 month period;
84.45 tons of CO per rolling 12 month period;
76.11 tons of POC (as CH4) per rolling 12 month period;
40.31 tons of Total Particulate Matter per rolling 12 month period; and
40.31 tons of PM10 per rolling 12 month period; and
40.31 tons of PM2.5 per rolling 12 month period; and; and
6.63 tons of SO2 per rolling 12 month period.
(Basis: Offsets, Cumulative Increase)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

AQ-14 The owner/operator shall comply with requirements (a) through (e) below under all operating scenarios, except during engine startup and shutdown (although startup and shutdown emissions shall be included in determining compliance with the facility-wide daily Total Particulate Matter emissions limit as set forth in subsection (c)).

a. The nitrogen oxide concentration at each point P-1 through P-14 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O2, averaged over any 1-hour period. (Basis: BACT for NOx)

b. The carbon monoxide concentration at each point P-1 through P-14 shall not exceed 13 ppmv, on a dry basis, corrected to 15% O2, averaged over any 1-hour period. (Basis: BACT for CO)

c. Total Particulate Matter, PM10, and PM2.5 emissions from any engine shall not exceed 1.3 lb/hr except as provided in Condition 16, and in any event shall not exceed 1.9 lb/hr. Total Particulate Matter, PM10, and PM2.5 emissions from all fourteen engines shall not exceed 461.65 lb/day. (Basis: BACT, Cumulative Increase)

d. The POC concentration at each point P-1 through P-14 with the corresponding engine operating at 75% or more of full load shall not exceed 25 ppmv on a dry basis, corrected to 15% O2, averaged over any 1-hour period. (Basis: BACT for POC)

e. Ammonia (NH3) emission concentrations at each point P-1 through P-14 shall not exceed 10 ppmv, on a dry basis, corrected to 15% O2, averaged over any rolling 3-hour period. The owner/operator shall quantify, by

continuous recording, the ammonia injection rate to A-1 through A-14 SCR Systems. The correlation between the engine heat input and the SCR System ammonia injection rates as determined in accordance with Condition **AQ-19** shall be used to calculate the corresponding ammonia emission concentration at emission points P-1 through P-14. The facility will notify the Engineering Division Permit Evaluation Manager in writing when any engine operates for 3 consecutive hours at a calculated ammonia slip rate equal to or greater than 10 ppmvd corrected to 15% O2 (in addition to any reporting required by District Regulation 1). The notification shall be provided to the District within one week of an engine operating at a calculated slip rate equal to or greater than 10 ppmvd corrected to 15% O2. If the parametric monitoring indicates a corresponding ammonia slip of 10 ppm corrected to 15% O2 for 3 consecutive hours, then the District may require a District approved source test for ammonia slip to demonstrate ongoing compliance and to update the parametric monitoring correlation as necessary. (Basis: Regulation 2, Rule 5)

Verification: The quarterly operation reports (**AQ-SC12**) shall include the following information:

a. operating parameters of emission control equipment, including but not limited to ammonia injection rate, NOx emission rate, and ammonia slip;

b. total plant operation time (hours), number of start-ups, hours in start-up, and hours in shutdown;

c. date and time of the beginning and end of each start-up and shutdown period;

d. average plant operation schedule (hours per day, days per week, weeks per year);

e. all continuous emissions data reduced and reported in accordance with the district-approved CEMS protocol;

f. maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NOx, CO, PM10, POC and SOx (including calculation protocol);

g. a log of all excess emissions, including the information regarding malfunctions/breakdowns;

h. any permanent changes made in the plant process or production that would affect air pollutant emissions, and indication of when changes were made; and

i. any maintenance to any air pollutant control system (recorded on an as-performed basis).

AQ-15 The owner/operator shall demonstrate compliance with Conditions **AQ-13** and **AQ-14** by using properly operated and maintained continuous monitors during all hours of operation including equipment start-up and shutdown periods for all of the following parameters:

a. Firing Hours and Fuel Flow Rates for each source

b. Carbon Dioxide (CO2) or Oxygen (O2) concentrations, Nitrogen Oxides (NOx) concentrations, and Carbon Monoxide (CO) concentrations at emission points P-1 through P-14

c. Ammonia injection rate at A-1 through A-14 SCR Systems

The owner/operator shall record all of the above parameters every fifteen (15) minutes (excluding normal calibration periods) and shall summarize all of the above parameters in accordance with the relevant permit limits. The owner/operator shall use the parameters measured above and District approved calculation methods to calculate the following parameters for each engine:

d. Corrected NOx concentrations, NOx mass emissions (as NO2), corrected CO concentrations, and CO mass emissions at each emission point for every 1-hour period

e. Total Heat Input Rate for every clock hour

f. The cumulative total Heat Input (MMBTU) for each calendar day for each engine

g. Calculate NOx mass emissions (as NO2) and CO mass emissions, for each calendar day for each engine, and for the previous consecutive twelve-month period using CEM data.

h. Calculate the mass emissions of PM-10, POC, and SOx (as SO2) for each calendar day for each engine and for the previous twelve-month period using District approved emission factors.
(Basis: 1-520.1, 9-9-501, BACT (except for SOx), Offsets, Cumulative Increase)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**). At least 30 days before first fire, the project owner shall submit to the CPM a plan on how the measurements, recordings, and calculations required by this condition will be performed. Prior to first fire, the project owner shall provide evidence of the District's approval of the calculation methods to the CPM.

AQ-16 The owner/operator shall demonstrate compliance with the 1.3 lb/hr Total Particulate Matter emissions limit in Condition **AQ-14(c)** by performing tests for Total Particulate Matter emissions as required by these conditions. If Total Particulate Matter emissions for an engine generator set exceed 1.9 lb/hr, then that engine generator set shall be deemed to be in violation of Condition **AQ-14(c)**. If Total Particulate Matter emissions for any engine generator set

exceed 1.3 lb/hr, but do not exceed 1.9 lb/hr, then that engine generator set shall not be considered to be in violation of Condition **AQ-14(c)** if the owner/operator can demonstrate, subject to approval by the APCO, that the engine has been installed, operated, and maintained properly in accordance with all manufacturer's specifications and instructions. The owner/operator shall so demonstrate by:

(i) retesting emissions within 45 days after receiving the final test report from the initial test exceeding 1.3 lb/hr, unless the APCO determines that a retest for Total Particular Matter is not appropriate (in accordance with the source testing requirements set forth in Condition **AQ-20**);

(ii) submitting to the APCO, within 30 days after receiving the final test report from the initial test exceeding 1.3 lb/hr, adequate documentation to verify that the engine has been installed, operated, and maintained properly in accordance with all manufacturers' specifications and instructions.

Within 30 days of receipt of the results of the retest and the documentation required by subsections (i) and (ii) above, the APCO shall make a determination whether the engine has been installed, operated, and maintained in accordance with manufacturers' specifications and instructions. If the APCO determines that the engine has been properly installed, operated, and maintained, then the engine shall be deemed not to be in violation of the single-engine hourly emission limit in Condition **AQ-14(c)** (although emission from the engine will still be counted for purposes of the facility-wide limit). If the APCO determines that the given engine has not been properly installed, operated, and maintained, then the engine shall be deemed to be in violation of Condition **AQ-14(c)**. Engines that operate pursuant to the provisions of this Condition **AQ-16** shall continue to be tested on a regular basis according to these Conditions.

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

AQ-17 Within 136 days of the beginning of the startup period (start of commissioning period for a given engine) for each engine at EEC, the Owner/operator shall conduct a District-approved initial source test for Particulate Matter, and POC on the corresponding emission point P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. The Owner/operator shall conduct a District-approved initial source test for SOx on one of the fourteen emission points with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: 2-1-411).

Verification: No later than 20 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The project owner shall provide evidence of the District's approval of the source test plan to the CPM prior to executing the tests. The project owner shall notify the District and the CPM at least seven working days prior to the planned source test date, and source test results shall be submitted to the District and the CPM within 60 days of completing the tests.

AQ-18 Prior to the end of the commissioning period, the Owner/operator shall conduct a District and CEC Compliance Program Manager (CPM) approved source test to establish emissions during startup and shutdown. The source test shall determine NOx, CO, POC and PM10 emissions during cold startup of the engines. The source test shall measure PM10 emissions during a cold startup of no fewer than 3 engines; one 30 minute test run shall be conducted per engine. The source test shall determine NOx, CO, and POC emissions during shutdown of the engines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. Twenty (20) working days before the execution of the source tests, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of this Condition, including specification of the number of tests. The Owner/operator shall notify the District and the CEC CPM at least seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District within 60 days of the date that source testing is completed at the facility.

Verification: No later than 20 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The project owner shall provide evidence of the District's approval of the source test plan to the CPM prior to executing the tests.

AQ-19 The owner/operator shall conduct an initial District-approved source test to determine the SCR System ammonia injection rate and the corresponding NH3 emission concentration at two of the fourteen emission points P-1 through P-14. The source test shall be conducted over the expected operating load range of the engines (including, but not limited to, 75% and 100% load) to establish the ammonia injection rates necessary to achieve NOx emission limits while maintaining ammonia slip levels. A correlation between NOx ppmv stack exit concentration, ammonia injection rate, heat input, and ammonia exit concentration shall be established for the two engines that were source tested. The test data shall be used as input for the calculation for the remaining engines. Ongoing compliance shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (Basis: Regulation 2, Rule 5).

Verification: Within 136 days of start-up of the facility, the source test to satisfy this condition shall be conducted. No later than 20 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The project owner shall provide evidence of the District's approval of the source test plan to the CPM prior to executing the tests.

AQ-20 The owner/operator shall obtain approval for all source test procedures from the Technical Services Division prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as approved by the Technical Services

Division. Twenty (20) working days before the execution of source testing, the owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of any of these Conditions, including specification of the number of tests. The Owner/operator shall notify the District at least seven (7) working days prior to the planned source test date. Source test results shall be submitted to the District and the CEC CPM within 60 days of completing the tests. (Basis: BACT)

Verification: The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests.

AQ-21 The owner/operator shall conduct a District approved source test no later than 365 days after than the initial Total Particulate Matter source test. The District approved source test shall determine the NH3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved test shall measure the Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

Verification: The project owner shall notify the District and the CPM at least seven working days before conducting the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests. The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests.

AQ-22 After completion of the initial source test and the first annual source test, the owner/operator shall conduct a District approved source test on each engine every 8,760 hours of operation or every 3 years whichever comes first. The District approved source test shall determine the NH3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

Verification: The project owner shall notify the District and the CPM at least seven working days before conducting the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests. The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests.

AQ-23 The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions from all emission points P-1 through P-14 combined to exceed the following limits:

1,3-Butadiene 872 pounds per year
Formaldehyde 11,200 pounds per year
unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may administratively adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

Verification: The project owner shall notify the District and the CPM at least seven working days before conducting the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests. The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests.

AQ-24 Within 136 days of start-up of the facility, the owner/operator shall conduct an initial District-approved source test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition **AQ-23** and to demonstrate that the facility complies with Regulation 2, Rule 5. The initial District approved source test for toxic air contaminants shall quantify the emission rates from one engine of the following compounds: 1,3 Butadiene, Formaldehyde, Acetaldehyde, Benzene, Toluene, Xylene, and Polycyclic Aromatic Hydrocarbons. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility. The owner/operator shall use the results of the initial source test for toxic air contaminants to perform a health risk assessment to determine the total facility risk using District approved procedures and unit risk factors.

Verification: The project owner shall notify the District and the CPM at least seven working days before conducting the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests. The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests. Health risk assessment results shall be submitted to the District and to the CPM within 90 days of the date of the tests.

AQ-25 The owner/operator shall conduct an additional District approved source test within 3 years of the initial test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition **AQ-23**. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility. (Basis: Regulation 2, Rule 5)

Verification: The project owner shall notify the District and the CPM at least seven working days before conducting the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests. The project owner shall provide evidence of the District's approval of all source test procedures to the CPM prior to executing the tests.

Conditions for S-15 Emergency Stand-by Generator at all Times

AQ-26 Operation of S-15 for reliability-related activities is limited to 50 hours per year. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(3).)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

AQ-27 The owner/operator shall operate engine S-15 only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(3).)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

AQ-28 The owner/operator shall operate engine S-15 only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § (e)(4)(G)(1).)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

AQ-29 Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry. Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

a. Hours of operation of S-15 for reliability-related activities (maintenance and testing).

b. Hours of operation of S-15 for emission testing to show compliance with emission limits.

c. Hours of emergency operation of S-15.

d. For each emergency, the nature of the emergency condition.

e. Fuel usage for S-15.
(Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(4)(I).)

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-30 At School and Near-School Operation: If S-15 is located on school grounds or within 500 feet of any school grounds, the owner/operator shall not operate it for non-emergency use, including maintenance and testing, during the following periods:

a. Whenever a school-sponsored activity is taking place a the school (if the engine is located on school grounds).

b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session. "School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(1).)

Verification: The project owner shall submit to the CPM the quarterly operation reports (**AQ-SC12**).

DEFINITIONS

Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf
Operating Hours:	Period of time during which fuel is flowing to a unit, measured in hours and minutes
MM BTU:	Million British Thermal Units
Engine BHP during operation:	(Electrical generator MW) x (1,341 bhp/MW) x (1.0319 loss factor)
Engine Start-up:	An engine start-up that occurs when the SCR catalyst bed is below minimum operating temperature as specified by the abatement device manufacturer. The maximum time for startup shall be 30 minutes.
Corrected Concentration:	The concentration of pollutants shall be corrected to a standard value of 15% O2 by volume on a dry basis. The following equation shall be used to calculate the corrected concentration: X@15%O2 = (20.95 – 15)/(20.95 – Stack O2%) x X@Stack O2%
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities during the commissioning period recommended by the equipment manufacturers and the Eastshore Energy Center construction contractor to insure safe and reliable steady state operation of the engines, abatement equipment, and associated electrical delivery systems
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when an engine is first fired, whichever occurs first. The period shall terminate when the source has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances. The period shall be determined separately for each engine generator set.
CEM:	Continuous Emission Monitor
Engine Shutdown:	The time period corresponding to the control system request to shutdown a specific engine until the engine generator set ceases operation. The maximum time for a shutdown shall be 8.5 minutes).
Total Particulate Matter	Sum of the filterable and condensable fractions of an EPA Method 5/Method 202 (or other District approved method) sampling train. When using EPA Method 5/Method 202 to demonstrate compliance with these

	permit conditions, EPA Method 5/Method 202 shall be used to determine the stack gas concentration of particulate matter. The mass emission rate shall be calculated using EPA Method 19 to determine the stack gas flowrate during the source test run.
PM10	Particulate matter with an aerodynamic diameter of 10 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
PM2.5	Particulate matter with an aerodynamic diameter of 2.5 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
SO_2	Sulfur Dioxide (SO_2)

ACRONYMS

BTU	British Thermal Unit
AFC	Application for Certification
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
ARB	California Air Resources Board
CEC	California Energy Commission
CEC CPM	California Energy Commission, Compliance Program Manager
CO	Carbon Monoxide
CO_2	Carbon Dioxide
EO/APCO	Executive Officer/Air Pollution Control Officer
FDOC	Final Determination of Compliance
GHG	Greenhouse Gases
NH_3	Ammonia
NMHC	Non-methane Hydrocarbons
NOx	Nitrogen Oxides
O_2	Oxygen
PDOC	Preliminary Determination of Compliance
PM10	Particulate Matter less than 10 Microns in Diameter
PM2.5	Particulate Matter less than 2.5 Microns in Diameter
POC	Precursor Organic Compounds
ppmvd	Parts Per Million by Volume, Dry
PSD	Prevention of Significant Deterioration
PUC	Public Utilities Commission
SCAQMD	South Coast Air Quality Management District
SCR	Selective Catalytic Reduction
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxides

TAC	Toxic Air Contaminant
TBACT	Toxics Best Available Control Technology
VOC	Volatile Organic Compounds

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AIR QUALITY APPENDIX 1

STAFF ESTIMATES OF SOX TO PM10 TRADING RATIO

The Eastshore applicant has provided information from previous BAAQMD actions to support their proposed interpollutant trading ratio of 3 lbs of SOx to mitigate each new pound of PM10 emissions (Response to Data Request 8, January 15, 2007).

Staff prepared an analysis for Amendment No. 1 of the Russell City Energy Center decision (01-AFC-7C) showing that use of a 3-to-1 ratio for trading SOx-to-PM10 was based on interpolated ambient concentration data for PM10 and its sulfates components rather than measured data. Staff (witness: Tuan Ngo) searched for additional measured data and attempt to replicate the project owner analysis to find a representative trading ratio of SOx for PM10. The staff method of analysis is identical to that submitted by the Russell City Energy Center project owner, but the PM10 sulfate data points are based on actual ambient concentrations measured at Concord, San Pablo and San Francisco air monitoring stations. Staff calculations of the SOx for PM10 interpollutant trading ratio using actual measured data are show below in **AIR QUALITY Appendix 1 Table 1**.

AIR QUALITY Appendix 1 Table 1
SO_2:PM10 Emissions Trade-Off Ratios Using Data Measured on 12-7-06

Site	Total SO_x ug/m^3 as SO_2	$(NH_4)_2SO_4$ ug/m^3	$(NH_4)_2SO_4$ $2H_2O$ ug/m^3	Range of Computed Trade-Off Ratios	Best Estimate
San Pablo	12.094	1.38	1.75	6.91:1 to 8.76:1	7.84:1
San Francisco	18.543	2.99	3.67	5.05:1 to 6.40:1	5.73:1
Concord	3.526	1.38	1.75	2.01:1 to 2.56:1	2.29:1
Area Average				**4.66:1 to 5.91:1**	**5.30:1**

Source: Russell City Energy Center Staff Assessment, June 2007 (01-AFC-7c).

Staff's analysis shows that if the actual measured data were used, then the range of interpollutant trading ratios of SOx for PM10 is 4.66:1 to 5.91:1, which yields an average interpollutant trading ratio of 5.30:1.

BIOLOGICAL RESOURCES

Testimony of Susan Sanders

SUMMARY OF CONCLUSIONS

The Eastshore Energy Center (Eastshore) is located in an industrial area of the City of Hayward. The proposed Eastshore site currently houses an industrial building, and the areas surrounding both the site and the route of the proposed linear facilities are highly developed. Because of the developed nature of the area, impacts to biological resources would be limited. Implementation of mitigation measures proposed by the applicant and California Energy Commission (Energy Commission) staff's proposed Conditions of Certification are necessary to avoid or minimize potential impacts to biological resources. The construction and operation of the project would be in compliance with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources if staff's Conditions of Certification are adopted and implemented.

INTRODUCTION

This section provides the Energy Commission staff's analysis of potential impacts to biological resources from the construction and operation of the proposed Eastshore facility. This analysis addresses potential impacts to state and federally listed species, species of special concern, sensitive plant communities, and other areas of critical biological concern. This analysis also describes the biological resources at the project site and related facilities. It determines the need for mitigation, the adequacy of mitigation proposed by the applicant, and, where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also determines the extent of compliance with applicable laws, ordinances, regulations, and standards (LORS), and recommends specific Conditions of Certification.

This analysis is based, in part, upon information provided in the Eastshore application for certification (AFC) (EEC 2006a), workshops, staff data requests, applicant data responses, site visits on September 29, 2006, January 29, and October 27, 2007, and discussions with various state and federal agency representatives.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL	
Clean Water Act (CWA) of 1977	Title 33, United States Code, Sections 1251-1376, and Code of Federal Regulations, Part 30, Section 330.5(a)(26), prohibit the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers (USACE).
Endangered Species Act (ESA) of 1973	Title 16, United States Code, Section 1531 et seq., and Title 50, Code of Federal Regulations, Part 17.1 et seq., designate and provide for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agency is the U.S. Fish and Wildlife Service (USFWS).
Migratory Bird Treaty Act	Title 16, United States Code, Sections 703 through 712, prohibit the taking of migratory birds, including nests with viable eggs. The administering agency is the USFWS.
Bald and Golden Eagle Protection Act	Title 16, United States Code, Section 668, prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.
STATE	
	The administering agency for the following state LORS is the California Department of Fish and Game (CDFG), except for the CWA Section 401 certification, which is administered by the Regional Water Quality Control Board.
California Endangered Species Act (CESA) of 1984	Fish and Game Code Sections 2050 through 2098 protect California's rare, threatened, and endangered species.
California Code of Regulations	California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, Sections 670.2 and 670.5, list plants and animals of California that are designated as rare, threatened, or endangered.
Fully Protected Species	Fish and Game Code Sections 3511, 4700, 5050, and 5515 prohibit the taking of animals that are classified as fully protected in California.
Nest or Eggs – Take, Possess, or Destroy	Fish and Game Code Section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey – Take, Possess, or Destroy	Fish and Game Code Section 3503.5 specifically protects California's birds of prey in the orders Falconiformes and Strigiformes by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Birds – Take or Possession	Fish and Game Code Section 3513 protects California's migratory non-game birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act, or any part of such migratory non-game bird.
Significant Natural Areas	Fish and Game Code Sections 1930 et seq. designate certain areas in California such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Native Plant Protection Act of 1977	Fish and Game Code Sections 1900 et seq. designate rare, threatened, and endangered plants in the State of California.

Regional Water Quality Control Board	By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
LOCAL	
City of Hayward General Plan, Vegetation and Wildlife Habitats, General	The planting of native vegetation should be encouraged, and, whenever possible, vegetation removed during construction should be replaced. The City's remaining riparian plant communities should be protected and development should not encroach into important wildlife habitats. Documented habitats of unique, rare, and/or endangered species of plants and wildlife should be protected, and the application of toxic chemicals should be minimized.
City of Hayward General Plan, Vegetation and Wildlife Habitats, Shoreline	Existing salt marshes should be preserved and new marshes established. Tidal flats and salt ponds of low salinity should be preserved for migratory waterfowl. Saltwater evaporation ponds should be preserved or enhanced in a manner commensurate with continued salt production. Activities that could have adverse effects on marine fisheries should be avoided.

SETTING

REGIONAL

The proposed project is located in the City of Hayward in the northern portion of the San Leandro Valley near the east shore of San Francisco Bay. The City of Oakland lies to the north, the foothills of the Diablo Range to the east and the City of Fremont to the south. The proposed project region was historically dominated by coastal salt marsh habitat. The diverse coastal salt marsh community supported a wide range of organisms; however, urban and industrial development, salt evaporation ponds, and horticultural landscapes have replaced much of the original coastal marsh habitat. Several wildlife habitat restoration projects in the area are attempting to restore wetlands, but only remnants of the original coastal salt marsh now exist in preserves and refuges.

LOCAL

The proposed Eastshore facility will occupy a 6.22-acre parcel in the City of Hayward, Alameda County, California. A large industrial building presently occupies the proposed Eastshore site. It is bordered to the south by a commercial office complex, to the west by industrial facilities, to the northeast by the Union Pacific Railroad, and to the east by Clawiter Road. Across Clawiter Road from the project site are a chiropractic college and a Berkeley Farms milk processing and distribution facility (EEC 2006a, p. 8.2-10). The area immediately surrounding the project site has been developed for industrial, commercial, and residential uses.

The nearest biologically significant area to the project site is the Hayward Regional Shoreline, a protected area located on the shore of San Francisco Bay approximately one mile west of the project site. Other biologically significant protected lands within the project vicinity include Don Edwards San Francisco Bay National Wildlife Refuge, Garin/Dry Creek Regional Park, Eden Landing Ecological Reserve, Lake Chabot Regional Park, and Coyote Hills Regional Park.

Habitat types within a one-mile radius of the proposed project site include salt ponds, grassland, marshland, ruderal grasslands, tidal channel, and landscaped areas. The primary habitats of biological interest are those located within Hayward Regional Shoreline, including the northern coastal salt marsh habitat (EEC 2006a, p. 8.2-13).

A variety of special status species are likely to occur in the project area including Contra Costa goldfields, salt marsh harvest mice, black skimmers, California black rails, California clapper rails, California least terns, burrowing owls, and western snowy plovers. For a list of special status species with the potential to occur in the project area, see **Biological Resources Table 1,** below.

Biological Resources Table 1
Special Status Species Potentially Occurring in the Project Area

Scientific Name	Common Name	Federal/State/CNPS *
Plants		
Astragalus tener var. *tener*	Alkali milk-vetch	--/--/List 1B
Acanthomintha duttonii	San Mateo thorn-mint	E/E/List 1B
Balsamorhiza macrolepis var. *macrolepis*	Big-scale balsamroot	--/--/List 1B
Centromadia parryi spp. *congdonii*	Congdon's tarplant	--/--/List 1B
Chorizanthe robusta var. *robusta*	Robust spineflower	E/--/List 1B
Cirsium fontinale var. *fontinale*	Fountain thistle	E/E/List 1B
Cordylanthus maritimus ssp. *palustris*	Point Reyes bird's-beak	--/--/List 1B
Dirca occidentalis	Western leatherwood	--/--/List 1B
Eriophyllum latilobum	San Mateo wooly sunflower	E/E/List 1B
Fritillaria liliacea	Fragrant fritillary	--/--/List 1B
Heliantella castanea	Diablo helianthella	--/--/List 1B
Hesperolinon congestum	Marin western flax	T/T/List 1B
Holocarpha macradenia	Santa Cruz tarplant	T/E/List 1B
Lasthenia conjugens	Contra Costa goldfields	E/--/List 1B
Layia carnosa	Beach layia	E/E/List 1B
Monardella villosa spp.*gglobosa*	Robust monardella	--/--/List 1B
Navarretia myersii spp. *myersii*	Pincushion navarretia	--/--/List 1B
Pentachaeta bellidiflora	White-rayed pentachaeta	E/E/List 1B
Plagiobothrys glaber	Hairless popcorn flower	--/--/List 1A
Sanicula maritima	Adobe sanicle	--/R/List 1B
Streptanthus albidus spp. *peramoenus*	Most beautiful jewelflower	--/--/List 1B
Suaeda californica	California seablite	--/--/List 1B
Mammals		
Reithrodontomys raviventris	Salt marsh harvest mouse	E/E
Birds		
Haliaeetus leucocephalus	Bald eagle	T/E
Charadrius alexandrinus nivosus	Western snowy plover	T/CSC
Laterallus jamaicensis coturniculus	California black rail	BCC/T
Pelacanus occidentalis californica	California brown pelican	E/E
Athene cunicularia	Burrowing owl	BCC/CSC
Rallus longirostris obsoletus	California clapper rail	E/E
Riparia riparia	Bank swallow	--/T

Sterna antillarum browni	California least tern	E/E
Reptiles		
Thamnophis sirtalis tetrataenia	San Francisco garter snake	E/E
Masticophis lateralis euryxanthus	Alameda whipsnake	T/T
Amphibians		
Ambystoma californiense	California tiger salamander	T/CSC
Rana aurora draytonii	California red-legged frog	T/CSC
Fish		
Oncorhynchus kisutch	Coho salmon	E/E
Oncorhynchus mykiss	Central California Valley steelhead	T/--
Oncorhynchus tshawytscha	Central Valley spring-run chinook salmon	T/T
Invertebrates		
Branchinecta lynchi	Vernal pool fairy shrimp	T/T
Microcina lumi	Fairmont micro-blind harvestman	--/--
Euphydryas editha bayensis	Bay checkerspot butterfly	T/--
Incisala mossii bayensis	San Bruno elfin butterfly	E/--
Speyeria zerene myrtleae	Myrtle's silverspot	E/--

*** Status Categories**:
Codes used in the table are:
E= Endangered; **T=** Threatened; **CSC=** CDFG Species of special concern; **FSC =** USFWS Species of concern; BCC = Birds of Conservation Concern; **R =** Rare; CNPS (California Native Plant Society - *Inventory of Rare and Endangered Plants of California*, 2007) List: **1A=** Presumed extinct in California; **1B=** Rare or endangered in California and elsewhere
Sources: EEC 2006a, CEC 2002a, USFWS 1998.

ANALYSIS OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) guidelines define direct impacts as those that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance, but are still reasonably foreseeable. The potential impacts discussed below are those most likely to be associated with the construction and operation of the Eastshore project.

Because of the diversity of biological resource impacts, staff also uses guidelines adopted by resource agencies.

CONSTRUCTION IMPACTS AND MITIGATION

Power Plant Site, Laydown Area, and Linear Facilities

Biological Resources **Table 1** lists special status species that could potentially occur in the project area. The potential for impacts to special status species is low because the proposed project is located in a highly developed area. A number of special status species are known to occur in San Francisco Bay and along its shores, but these areas are highly unlikely to be impacted by the Eastshore project. An industrial building and paved asphalt areas currently occupy the proposed Eastshore site. The only vegetation on the site are ruderal vegetation and landscape species that do not provide habitat to any special status wildlife species known to exist in the area.

Eastshore has proposed that a lot across Clawiter Road from the power plant site be used as a laydown area during project construction. The laydown area is a disturbed 4.65-acre parcel that contains areas of ruderal vegetation (EEC 2006a). Use of the laydown area during project construction may impact common species such as house sparrows, mourning doves, or house finches, but impacts are not expected to be significant due to the limited biological resource value of the parcel and the lack of special status species habitat on the laydown area site.

The Eastshore project will include construction of an overhead electrical transmission line from the power plant site to PG&E's Eastshore Substation. The Eastshore Substation is located approximately 1.1 mile south of the proposed power plant site (EEC 2006a). The electrical transmission line route follows a fully developed area and is not expected to impact biological resources, with the exception of impacts to ornamental landscaping trees with limited biological resource value (EEC 2006a, p. 8.2-12); the possible impacts to wildlife habitat surrounding the Eastshore Substation are discussed below.

Special Status Wildlife Impacts

Special status wildlife species likely to occur in the Hayward Regional Shoreline include the salt marsh harvest mouse (*Reithrodontomys raviventris*), California clapper rail (*Rallus longirostris*), western snowy plover (*Charadrius alexandrinus nivosus*), California brown pelican (*Pelicanus occidentalis californicus*), burrowing owl (*Athene cunicularia*), and the California least tern (*Sterna antilarium browni*) (EEC 2006a, p. 8.2-24).

Salt Marsh Harvest Mouse

The salt marsh harvest mouse, a federally and state endangered species, is found in salt marsh habitat along San Francisco Bay. Because salt marsh habitat will not be disturbed by the Eastshore project, no impacts to the salt marsh harvest mouse are expected.

California Clapper Rail

The California clapper rail, a federally and state endangered species, is generally found in coastal areas, including salt marshes and other habitats found in the Hayward Regional Shoreline along San Francisco Bay. Because California clapper rail habitat will not be disturbed by construction of the Eastshore project, no impact is expected on the California clapper rail.

Western Snowy Plover

The western snowy plover, a federally threatened species and a California species of special concern, generally inhabits coastal areas such as beaches or dunes. This species may occur in Hayward Regional Shoreline. Because western snowy plover habitat will not be disturbed by construction of the Eastshore project, impacts to western snowy plover are not expected.

California Brown Pelican

The California brown pelican, a federally and state endangered species, is found in coastal areas, including San Francisco Bay. Because California brown pelican habitat

will not be impacted by construction of the Eastshore project, impacts to the California brown pelican are not expected.

California Least Tern

The California least tern, a federally and state endangered species, is likely to be found in coastal areas along San Francisco Bay and may breed along the shoreline of the bay. Because impacts to California least tern habitat are not expected, impacts to California least tern are not expected.

Burrowing Owl

The burrowing owl, a California species of special concern, occurs in open habitats such as grasslands or sparse desert scrublands, and can also occasionally be found in vacant, grassy lots in urbanized areas. While the proposed project site, laydown area, and alignment for linear facilities are either paved or barren of vegetation, and therefore inhospitable to burrowing owls, the land surrounding PG&E's Eastshore Substation is an undeveloped field dominated by non-native annual grasses and could support this species (EEC 2006a, p. 8.2-12; CEC 2002a). Furthermore, burrowing owls have been reported approximately 750 feet south of the substation (Taylor 2001 in CEC 2002a).

Surveys conducted by the applicant on June 28, 2006, did not detect burrowing owls in the field surrounding the substation, but their potential presence cannot be ruled out without additional surveys. Construction activities associated with building the 115 kV tie line at the east side of the PG&E's Eastshore Substation will result in disturbance to this grassland habitat with potential impacts to burrowing owls. The applicant has stated that pre-construction surveys will be conducted to determine if burrowing owls are present in or near the transmission line impact area, and to implement avoidance measures if they are detected during the surveys. Energy Commission staff agrees with the applicant's proposal to conduct pre-construction burrowing owl surveys. If burrowing owls are found during pre-construction surveys, appropriate measures must be followed to mitigate potential impacts to burrowing owls to less than significant levels. Staff's proposed Condition of Certification **BIO-10** requires that surveys be conducted as described in the California Department of Fish and Game's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995). If this species is observed during the surveys, avoidance and mitigation measures described in the *Staff Report* (CDFG 1995) shall be implemented. Compliance with these measures will ensure that no significant adverse impacts to burrowing owls will occur.

Special Status Plants

Several special status plants are known to occur in the project vicinity, as indicated by Biological Resources **Table 1**. The California Natural Diversity Database indicates a record of Contra Costa goldfields (*Lasthenia conjugens)*, a federally endangered species, within one mile of the project site. Contra Costa goldfields grow in vernal pools within open grassy areas. Direct impacts to Contra Costa goldfields and other special status plants are not expected due to lack of suitable habitat on the project site and laydown area, and along linear facilities.

Proposed Mitigation Measures

The applicant has proposed conducting preconstruction surveys of the project site, laydown area, and transmission line route for nesting birds and other species (EEC 2006a, p. 8.2-29). In addition, the applicant has proposed implementing worker environmental awareness training to ensure that construction staff will avoid impacts to wildlife and that construction activities will not affect wildlife habitat (EEC 2006a, p. 8.2-29). Staff agrees with the applicant's proposed mitigation measures.

In addition, Energy Commission staff's proposed biological resources Conditions of Certification **BIO-1** through **BIO-7** and **BIO 10** will ensure that impacts to special status species are less than significant. Condition of Certification **BIO-1** requires the selection of a qualified designated biologist by the project owner. A qualified designated biologist is needed to oversee the implementation of mitigation measures to avoid and minimize impacts to biological resources. Condition of Certification **BIO-2** outlines specific duties that the designated biologist will carry out to mitigate these potential impacts. Condition of Certification **BIO-3** outlines the qualifications for any biological monitors assigned to assist the designated biologist. Condition of Certification **BIO-4** describes the authority of the designated biologist and the biological monitor to ensure that impacts to biological resources are avoided to the extent possible. Condition of Certification **BIO-5** describes a worker environmental awareness program that will be required to ensure that construction personnel do not cause impacts to biological resources during construction of the Eastshore facility. Condition of Certification **BIO-6** describes a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) that will be prepared by the applicant and will describe all necessary measures to ensure compliance with LORS, and minimize impacts to biological resources. Condition of Certification **BIO-7** requires that sensitive biological resources be avoided in the design, installation, and maintenance of transmission line poles and other facilities. Condition of Certification **BIO-10** requires that survey protocol and, if necessary, mitigation measures outlined in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995) be implemented before performing ground disturbing activities.

The implementation of mitigation measures proposed by the applicant and the implementation of staff's proposed Conditions of Certification are necessary for mitigating potential construction impacts to special status wildlife species. Potential impacts to special status species as a result of project operation are discussed in the Operations Impacts section.

Sensitive Habitats

Hayward Regional Shoreline, part of the East Bay Regional Park District, consists of 1,697 acres of salt, fresh, and brackish water marshes, and seasonal wetlands. This protected area provides habitat for several special status species, including California clapper rail, western snowy plover, and the salt marsh harvest mouse. The Hayward Regional Shoreline is located approximately one mile west of the Eastshore site. Other regional parks that include remnants of the northern coastal marsh complex and other native plant communities that once characterized this area include the Martin Luther King Jr. Regional Shoreline (three miles northwest of the project site), Eden Landing Ecological Reserve (three miles south of the project site), the Don Edwards San Francisco Bay National Wildlife Refuge and Coyote Hills Regional Park (five miles south

of the project site). Other biologically significant and sensitive lands within the project vicinity include Garin/Dry Creek Regional Park (five miles east of project site), and Lake Chabot Regional Park (five miles northeast of the project site). No direct project impacts are anticipated to sensitive habitats or species within these protected parklands because construction activities will take place at least one mile or more from these sensitive resources. No sensitive habitats occur within the proposed project site, laydown area, or along the proposed transmission line route, but surveys conducted in January 2007 identified a seasonal wetland in the field on the south side of the Eastshore Substation (CH2MHill 2007b, Attachment DR 17-1). The proposed transmission line route will exit the substation on the east side of the Eastshore Substation, and will run in a northerly direction (CH2MHill 2007c Attachment BIO-1). Construction of this 115 kV tie line will occur in the east side of the PG&E's Eastshore Substation, approximately 500 feet northeast of the seasonal wetland on the opposite side of the substation. Given this route, no impacts to this or any other wetland are anticipated as a result of transmission line construction.

Permanent and Temporary Habitat Loss

The Eastshore site contains some ruderal vegetation and several ornamental trees that would be eliminated during construction. The ruderal vegetation and ornamental trees may provide nesting habitat for common bird species such as house finches or mourning doves that inhabit the area. Loss of ornamental landscaping may impact wildlife; however, the habitat value is very limited. In addition, new landscape vegetation that would be required for the Eastshore project to comply with city of Hayward landscaping requirements would provide new wildlife habitat very similar to any wildlife habitat lost during construction of the project. The applicant will be required to develop and implement a landscaping plan to improve the aesthetic qualities of the project. The Visual Resources section of this staff assessment discusses landscape vegetation requirements in detail. Habitat loss on the project site is not expected to be significant.

Construction Noise

Construction or operation noise could impact special status species and other wildlife by disturbing foraging, nesting, or other activities in the vicinity of the project site. The applicant estimates that average noise levels from construction activities will be as high as 71 decibels (dBA) at 375 feet, and as high as 53 dBA at 3,000 feet (EEC 2006a, Table 8.5-8).

Studies have shown that noise levels over 60 dBA can affect the behavior of certain bird species. In addition, 60 dBA has been used by the USFWS as a reference point for evaluating noise impacts on wildlife (CEC 2002a). Because there is no habitat for special status species within 3,000 feet of the project site, and average construction noise levels at 3,000 feet from the project site would be below 60 dBA, staff does not expect construction noise to have significant impacts on special status species. Increased noise levels may impact wildlife within 375 feet of the project; however, the highly developed nature of the area surrounding the proposed Eastshore site provides very limited habitat for wildlife. Due to the limited available habitat within the affected area, staff does not expect such impacts to be significant.

OPERATIONS IMPACTS AND MITIGATION

Collision and Electrocution

San Francisco Bay is located along the Pacific Flyway, one of four major bird migration routes in North America. Seventy percent of the birds that migrate along the Pacific Flyway spend some time each year in San Francisco Bay, and the bay is home to at least 800,000 water birds at any one time (USGS 2007). The close proximity of the proposed project to San Francisco Bay's large concentration of birds creates the potential for direct impacts to birds through electrocution or collision with transmission lines, towers, and exhaust stacks. The Eastshore project would include construction of a 1.1-mile long transmission line consisting of 10 to 12 ninety-foot tall transmission poles and 14 seventy-foot tall exhaust stacks.

Electrocution

Large birds such as raptors and egrets may be electrocuted by transmission lines and towers if they simultaneously contact two conductors or a conductor and a ground wire. To avoid potential electrocution impacts, the applicant has proposed constructing transmission lines in accordance with Avian Power Line Interaction Committee guidelines designed to significantly reduce the risk of electrocution (EEC 2006a, p. 8.2-25). These guidelines outline methods of configuring and designing utility line components and recommend spacing distances between utility line components to reduce the likelihood of avian electrocution. Staff agrees with the proposed mitigation measure and believes that its implementation, along with staff's proposed Condition of Certification **BIO-7**, will reduce potential impacts to less than significant levels. Condition of Certification **BIO-7** requires that transmission lines be designed and built in accordance with the Avian Power Line Interaction Committee's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

Collisions

Avian collisions with communication towers and other tall structures were documented as early as 1880. Hundreds or thousands of birds have been known to die in a single night due to collision with a tall structure (Kerlinger 2000). Avian collisions are possible with the Eastshore project's exhaust stacks and other facilities. The AFC indicates that exhaust stacks will be 70 feet high. Structures over 500 feet high are known to present a greater risk to migratory songbirds than shorter structures (Kerlinger 2000). Because the exhaust stacks are significantly less than 500 feet high, they would pose a relatively low risk to migrating birds. Lights on tall structures are also known to attract birds, increasing their collision risk (Manville 2000). Eastshore's lighting will be shielded to direct light downward, reducing its attraction to birds (EEC 2006a, p. 8.2-25). Implementation of staff's proposed Condition of Certification **BIO-7,** requiring that lighting be installed in a manner that prevents side casting. This mitigation measure will minimize bird collisions with Eastshore's exhaust stacks, reducing potential impacts to less than significant levels.

Collision with the terminal ground wire (or static wire) of transmission lines has also been reported as a significant cause of avian fatalities (APLIC 2006). Transmission line ground wires are smaller in diameter and significantly less visible than transmission wires. Ground wires are installed on transmission lines to deflect lightning strikes,

thereby preventing damage to transmission structures and other equipment. Fatal strikes may also occur when birds collide with transmission and distribution wires and other structures associated with electrical power transmission (CEC 2002b). Potential impacts due to collision with transmission lines and exhaust stacks are highest during periods of low visibility such as fog or rain. The likelihood of collision is considered low because the highly developed project area does not provide habitat that would attract substantial numbers of birds to the site. To minimize the potential for bird collisions with transmission lines, the applicant has proposed to install bird flight diverters (EEC 2006a, p. 8.2-25, 8.2-29). Properly installed bird flight diverters are known to decrease the collision risk to birds by making the transmission line more visible to them, although the effectiveness of such diverters in low visibility conditions has not been confirmed and is the subject of ongoing research (Spiegel personal communication). Staff agrees with the proposed mitigation measures and concludes that installation of bird flight diverters on the transmission line will reduce the risk of collisions to less than significant levels. Staff's proposed Condition of Certification **BIO-7** requires the installation of bird flight diverters on aboveground transmission lines.

Operation Emissions Impacts

Criteria Pollutants and Toxic Air Pollutants

Operation of the Eastshore project would result in emissions of criteria pollutants and toxic air pollutants, primarily particulate matter (PM), carbon monoxide (CO), oxides of sulfur (SO_x), nitrogen oxides (NO_x), and precursor organic compounds (POC). Toxic air pollutant emissions include toxic gases and toxic particular matter species (EEC 2006a).

Elevated levels of CO, SO_X, NO_X, and particulate matter have the potential to adversely impact biological resources. To minimize air pollutant emissions, the project would employ best-available control technology and would comply with air quality standards that are designed to protect human health, vegetation, and wildlife. Staff analyzed the potential for direct impacts of CO, SO_x, NO_x, and airborne particulates on vegetation and determined that the emission levels of these pollutants from the Eastshore project are not likely to have significant impacts on biological resources.

Toxic air pollutants have the potential to impact biological resources. An analysis of toxic air pollutants on human health indicates that the project would not have significant impacts (see **Air Quality** and **Public Health** sections for details). The standards for impacts to human health are lower than they are for impacts to wildlife and vegetation; therefore, staff believes that the impacts of toxic air pollutants on biological resources would be less than significant.

Nitrogen Deposition Impacts

Nitrogen deposition consists of the input of reactive nitrogen species from the atmosphere to the biosphere. Pollutants that contribute to nitrogen deposition derive mainly from nitrogen oxides and ammonia emissions, which the Eastshore project would emit during normal operation. Emissions of NOx and ammonia contribute to nitric acid deposition that occurs via precipitation and fog and in dry deposition as well. Acute exposures to ammonia can adversely affect plant growth and productivity, resistance to

drought and frost, responses to insect pests and pathogens, mycorrhizal and other beneficial root associations, and inter-specific competition and biodiversity in sensitive plant communities (Krupa 2003). The effects of ammonia, nitrogen oxides, and nitric vapor are most acute close to the source of the emission, where they can produce visible injuries in plants (Bytnerowicz et al. 1998), but ammonia is also converted in the atmosphere to ammonium (NH4+) particles that can be a problem at a regional scale (Krupa 2003).

Much of the research in California on the effects of nitrogen deposition to plant communities has been on wildland ecosystems within the South Coast air basin, particularly in chaparral and mixed conifer zones. Low biomass ecosystems throughout the state, including coastal sage scrub, serpentine grassland, and desert scrub, have also been the subject of research on the effects of nitrogen deposition (Weiss 2006b, Fenn et al. 2003). In these communities increased nitrogen deposition can increase growth and dominance of invasive annual grass. Other communities that can be harmed by increased level of anthropogenic nitrogen are vernal pools, lichen and sand dune communities, and oligotrophic mountain lakes (CEC 2006, Morris 1991).

Of particular concern for the Eastshore project is the effect on serpentine soil plant communities, which are know to be particularly sensitive to nitrogen deposition. Serpentine soils in the San Francisco Bay Area support native grassland plant communities that can provide habitat for rare and endemic species (Weiss 1999). Non-native annual grasses have invaded most grassland communities in California, but highly specialized plant species that are adapted to nutrient-poor serpentinitic soils can thrive in soils that are deficient in nitrogen, potassium, phosphorus, and other nutrients due to a competitive advantage over the faster growing non-native annual species (Kruckeberg 1984). The competitive advantage of these specialized plant species can be lost when nitrogen deposition from air pollution fertilizes serpentine plant communities and nitrogen ceases to be a limiting nutrient for plant growth. Increased nitrogen levels often allow non-native annual grasses to out-compete the native species (Weiss 1999).

The nearest serpentine plant community to the project area is Fairmont Ridge in Lake Chabot Regional Park, approximately five miles northeast of the Eastshore project. Fairmont Ridge is located in the East Bay Hills adjacent to Lake Chabot. The California Native Grasslands Association identifies this area as a Purple Needlegrass Grassland community, and is noted as an area of serpentine soil in the USFWS's 1998 *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area*.

The Eastshore project would contribute about 0.27 µg/m^3 NO_2, or less than one percent of the existing 28 µg/m^3 background NO_2 to the cumulative annual ambient air quality conditions at the Fairmont Ridge near Lake Chabot Regional Park (see **Air Quality** section). The ammonia concentration would be about the same order of magnitude. With respect to nitrogen deposition, California Air Resource Board studies have found that historically at Fremont the sum of wet and dry deposition rates are roughly 11 percent of the basin-wide NOx emission rates (ARB 1996), or roughly 7 kilograms of total nitrogen per hectare per year (kg/ha/yr) over 1988 to 1993 levels. Emissions are concentrated in urban areas and are dominated by mobile sources, but deposition occurs more uniformly over a region. Statewide modeling of nitrogen deposition shows

that the baseline deposition rate in 2002 was probably between 6 and 8 kg/ha/yr for the hills east and north of the project site (CEC 2007). Regional NOx emissions today are lower than they were before 2002, so the total current nitrogen deposition rate to soils, water, and vegetation in the project area is probably around 6 kg/ha/yr (Birdsall personal communication).

A critical load for nitrogen deposition on plant communities, which is the threshold at which harmful effects on sensitive receptors begin to occur (Porter 2004), depends on the type of plant community and many other factors. A benchmark of 5 kg/ha/yr is often used for comparing nitrogen deposition among plant communities, but does not imply this is the critical load for negative impacts for all ecosystems because some may be more sensitive and some less so (Weiss 2006b). Current information indicates a critical load of 5-10 kg/ha/yr for vulnerable terrestrial ecosystems (such as heaths and bogs) and a critical load of 10-20 kg/ha/yr for forests (Krupa 2003). Research conducted in the South San Francisco Bay Area indicates that intensified annual grass invasions can occur in areas with nitrogen deposition levels of 11-20 kg/ha/yr, with limited invasions at levels of 4-5 kg/ha/yr (Weiss 2006a; Weiss 2007). Such grassland invasions are of critical concern where threatened and endangered butterflies and other herbivorous insects are vulnerable to displacement of larval hostplants and nectar sources by annual grasses (Weiss 2006b).

Another biologically significant plant community close to the source of nitrogen emissions from the project is salt marsh habitat in the Hayward Regional Shoreline. The direct effects of ammonia and atmospheric nitrogen deposition have not been assessed in California salt marshes (Weiss 2006b), although it is known that salt and freshwater marsh productivity is limited by nitrogen (Morris 1991). Salt marshes export organic nitrogen to adjacent coastal waters, but are also major sites for denitrification (Weiss 2006b).

To further assess the levels of nitrogen deposition on sensitive biological resources, including salt marshes and serpentine plant communities, additional analyses were conducted on deposition rates at varying distances from the project area (see **Air Quality** section for more details). **Biological Resources Table 2** summarizes the cumulative nitrogen deposition rates at biologically sensitive areas at distances up to six miles from the Eastshore project site. The locations were selected from sensitive species occurrence records from the California Natural Diversity Data Base. These values include all NOx and NH3 from all cumulative sources, including the Russell City Energy Center and the sources listed in the **Air Quality** section on cumulative impacts. Actual deposition rates are likely to be much less than the levels shown in Table 2 because nitrogen from the new sources will probably need a much greater distance than just a few miles to convert to nitric acid or ammonium nitrate (Birdsall personal communiciation).

Biological Resources Table 2
Cumulative Nitrogen Deposition Rates at Biologically Sensitive Areas Near the Eastshore Energy Center

Location of Biologically Sensitive Area (UTM)	CNDDB Record (Occurrence No.)	N Deposition Rate (kg/ha/yr)
Sulphur Creek at Hayward Shoreline, 1.5 miles west of project area (Zone-10 N4168503 E574491)	Clapper rail (#107)	1.435
Roberts Landing, 4 miles northwest of project area (Zone-10 N4170723 E573489)	Salt marsh harvest mouse (#100)	0.800
Mouth of Alameda Creek, five miles southwest of project area (Zone-10 N4161062 E576677)	Clapper rail (#9)	1.048
Oak Hill Canyon, Garin Regional Park, six miles east of project area (Zone-10 N4165784 E585066)	Most beautiful jewelflower (#67)	1.081
Fairmont Ridge near Lake Chabot, Valley needlegrass grassland, five miles northeast of project area) Zone-10 N4174951 E577783	Valley needlegrass grassland (#52)	1.777

Nitrogen deposition resulting from the Eastshore project would not add significantly to the estimated baseline levels at the biologically sensitive locations noted above, and would not substantially contribute to the adverse effects of nitrogen on plant communities or aquatic ecosystems. No threatened or endangered butterflies or other herbivorous insects dependent on native hostplants are present in the project area that would be affected by increased nitrogen deposition Habitat for the Bay checkerspot butterfly (*Euphydryas editha bayensis)* is similar to the serpentine soil plant communities found on Fairmont Ridge. Fairmont Ridge may have been historic habitat for the butterfly; but the species has been extirpated from Alameda County and is not known to exist at any other site within five miles of the Eastshore project. The Bay checkerspot butterfly is currently known from populations in Santa Clara and San Mateo counties, but would not be impacted by the Eastshore project due to the distance of the project from known populations of the species.The Fairmont micro-blind harvestman (*Microcina lumi*) is not listed as threatened or endangered, but is one of five species of micro-blind harvestman identified in the *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area*. These five species occur in serpentine grasslands and outcroppings in the greater San Francisco Bay Area (USFWS 1998). The Fairmont micro-blind harvestman is known exclusively from two populations at Fairmont Ridge (USFWS 1998; CNDDB 2007). Staff assessed potential impacts to the Fairmont micro-blind harvestman that might result from increased nitrogen deposition and subsequent changes in plant species composition. *M. lumi* is a small (under 1 millimeter), predatory, subterranean species that cannot tolerate drying conditions; it waits out the dry season by inhabiting cracks in the soil where moisture levels are high (Ubick personal communication). The reasons for its association with serpentine soils are unknown, but may relate to the way serpentine soil cracks deeply when it dries, providing a moist refuge (Ubick personal communication). While little is known about this species, the evidence suggests that increased nitrogen deposition would not have adverse impacts to *M. lumi* because their association with serpentine is probably related more to the physical characteristics of the soil rather than to plant species composition.

Furthermore, the Eastshore project is located more than five miles from Fairmont Ridge and nitrogen concentration levels from the project would decrease substantially at a distance of five miles (see **Air Quality** section); therefore, staff does not believe that project-related increases in nitrogen deposition at Fairmont Ridge would result in significant impacts to the Fairmont micro-blind harvestman.

Staff has consulted relevant agencies to assess their concerns about whether the Eastshore project's nitrogen emissions may contribute to cumulatively significant impacts to sensitive species and their habitat. To date, the USFWS and CDFG have not expressed concerns regarding nitrogen deposition due to emissions from the Eastshore project.

Based on this analysis and on information from the scientific literature, staff has concluded that nitrogen deposition from the Eastshore project will not result in significant impacts to sensitive ecosystems or special status species in the project vicinity.

CUMULATIVE IMPACTS

Cumulative impacts refer to a proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects (Public Resources Code § 21083; California Code of Regulations., Title 14, §§ 15064(h), 15065(c), 15130, and 15355).

As described earlier, both the project site and the entire project area are highly developed, and the potential for impacts to biological resources due to the Eastshore facility are low. The project would not directly impact any state or federally listed species or sensitive habitats such as wetlands. The majority of the biologically significant land in the project region is protected from development because it is part of either the Hayward Regional Shoreline or the Eden Landing Ecological Reserve. The project area is highly developed and most future projects in the area are likely to be redevelopment of previously developed land. The overall character of the project area is unlikely to change significantly with respect to biological resources.

The Russell City Energy Center (RCEC) is a separate power plant project in Hayward that has been licensed by the Energy Commission. The location of the RCEC was originally located approximately 4,000 feet west of the proposed Eastshore facility. On October 3, 2007, the Energy Commission approved an amendment that moved the RCEC 1,300 feet northwest of the originally proposed location, bringing it closer to the Eastshore project site (Commission Adoption Order No. 07-0926-04, Petition to Amend the Commission Decision Approving the Application for Certification for the Russell City Energy Center). The RCEC project is not expected to significantly impact biological resources, and impacts that do occur will be further mitigated by requirements contained in the Energy Commission's Conditions of Certification for the RCEC.

Without impact avoidance and mitigation measures, the combined effects of the RCEC and Eastshore projects could cause cumulative impacts to burrowing owls through habitat disturbance near the Eastshore Substation, and to various bird species by increasing the likelihood of avian collisions with new transmission lines. Potential

impacts to burrowing owls, a California species of special concern, due to construction of the Eastshore transmission line would be mitigated to less than significant levels by implementing pre-construction surveys and avoidance protocols. In addition, potential impacts to burrowing owl habitat would be primarily temporary in nature. After installation of the transmission line poles is complete, the habitat value of the land surrounding the Eastshore Substation would be expected to be substantially unchanged. Because of the low potential for impact and the temporary nature of potential impacts to burrowing owls, the cumulative impacts to burrowing owls are not expected to be significant.

The RCEC project will include construction of a transmission line similar to the Eastshore facility's transmission line. Construction of the two transmission lines could cause cumulative impacts to resident and migratory bird species by potentially increasing the likelihood of avian collisions with the transmission lines. Eastshore will incorporate bird flight diverters on its transmission lines to mitigate potential avian collision impacts. The RCEC project is also required to install bird flight diverters on its transmission line. In addition, the Eastshore transmission line will be located in an area that already contains tall structures. No cumulative impacts from bird collisions with transmission lines are expected because both the RCEC and Eastshore lines will be constructed in developed areas that support low numbers of birds, and because bird flight diverters will be installed on new transmission lines.

Staff concludes that with implementation of mitigation measures and compliance with Conditions of Certification, the Eastshore project will not result in cumulative impacts to special status species.

COMPLIANCE WITH LORS

The proposed Eastshore site is in a developed area and does not act as a significant wildlife corridor, nor does the project conflict with any local policies or ordinances protecting biological resources. The proposed Eastshore project would not be immediately adjacent to any sensitive natural communities that exist in the region. The proposed project does not conflict with the provisions of an adopted habitat conservation plan or natural community conservation plan or other approved local, regional, or state habitat conservation plans. No biological resources of either commercial or recreational value occur on the Eastshore project site. The construction and operation of the project would be in compliance with all federal, state, and local LORS related to biological resources if staff's Conditions of Certification are adopted and implemented.

FACILITY CLOSURE

Sometime in the future, the Eastshore facility will close either through a planned or an unexpected (either temporary or permanent) closure. When the facility closes, it must be done in such a way as to protect the environment and the public health and safety. To address facility closure, an on-site contingency plan will be developed by the project owner and approved by the Energy Commission compliance project manager. Facility

closure mitigation measures will also be included in the biological resources mitigation implementation and monitoring plan prepared by the applicant.

In the event that the Energy Commission compliance project manager decides that the facility will be permanently closed, the facility closure measures provided in both the on-site contingency plan and biological resources mitigation implementation and monitoring plan would need to be implemented. Closure measures should include the removal of structures that could cause avian collisions. For more information, see staff's proposed biological resources Condition of Certification **BIO-8**.

RESPONSE TO PUBLIC COMMENTS

Comment: The project may result in increased risk of predation on clapper rail chicks.

Staff received a comment regarding the potential impacts to California clapper rail chicks due to predation from ravens and/or crows. The commenter was concerned that transmission towers installed as part of the Eastshore project might provide increased perching opportunities for ravens and/or crows, which can prey on clapper rail chicks. While increased perching opportunities in the vicinity of California clapper rail habitat could impact California clapper rails, potential clapper rail breeding habitat is approximately one half mile away from the nearest transmission tower site. Due to the distance of the transmission towers from clapper rail breeding habitat, impacts to clapper rails are not expected.

Comment: Wetlands at the bay shoreline and in the vicinity of the PG&E substation may be impacted by construction.

Staff received a comment about potential impacts of the project to wetlands along San Francisco Bay. The wetlands along the shoreline of San Francisco Bay will not be impacted by the project because of their distance from project construction activities. Comments were also received on potential impact of construction on seasonal wetlands occurring in the vicinity of the PG&E substation. Construction of the 115 kV tie line at the east side of PG&E's Eastshore Substation will not affect the seasonal wetland south of substation because it is approximately 500 feet from the construction activity. No impacts to this or any other wetland are anticipated as a result of the Eastshore project.

Comment: Address impacts to burrowing owls of transmission line construction and discuss how results of pre-construction surveys will be used.

Construction activities associated with building the 115 kV tie line at the east side of the PG&E Eastshore Substation will result in disturbance to grassland habitat that could support burrowing owls. To avoid potential impacts to this special status species, pre-construction surveys will be conducted in accordance with methods described in the California Department of Fish and Game's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995). If burrowing owls are detected within approximately 500 feet from proposed construction activities, avoidance and mitigation measures discussed in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995) shall be implemented before performing ground-disturbing activities.

Comment: Bird diverters are not an effective means of diverting birds, especially in foggy conditions.

The risk of birds colliding with transmission lines is highest during periods of low visibility such as fog or rain. The likelihood of bird collision in the project area under any conditions is considered low because the highly developed site does not provide habitat that would attract substantial numbers of birds. In addition, the applicant has proposed installing bird diverters on transmission lines to further minimize potential collision risk. While the effectiveness of bird diverters in low visibility conditions has not been confirmed and is the subject of ongoing research, these devices have been shown to be useful under some conditions for minimizing collision risk. Staff considers the potential for impacts due to bird collisions with transmission lines to be less that significant in the project area because few birds are attracted to this developed area, and because the installation of bird diverters will further minimize potential risk.

Comment: Address the effects of ammonia and increased nitrogen on sensitive species and plant communities, including effects of nitrogen deposition on serpentine plant communities, and effects on fish and other aquatic life at Lake Chabot and San Leandro Reservoir.

Acute exposures to ammonia can adversely affect plants, and nitrogen deposition can harm sensitive plant communities by a variety of mechanisms, including increasing growth and dominance of invasive, non-native annual grass. Of particular concern for the Eastshore project is the effect on serpentine soil plant communities, which are known to be particularly sensitive to nitrogen deposition. The nearest serpentine plant community to the project area is Fairmont Ridge in Lake Chabot Regional Park, approximately five miles northeast of the Eastshore project.

The Eastshore project and cumulative projects would contribute about 0.27 $\mu g/m^3$ NO_2, or less than one percent of the existing 28 $\mu g/m^3$ background NO_2 to the cumulative annual ambient air quality conditions at the Fairmont Ridge near Lake Chabot Regional Park (see **Air Quality** section). The ammonia concentration would be about the same order of magnitude.

To further assess the effects of nitrogen deposition on sensitive biological resources in the vicinity of the Eastshore project site, staff conducted additional analyses to estimate deposition rates at distances from one to six miles from the project area. The locations selected for analysis came from sensitive species occurrence records from the California Natural Diversity Data Base, and included the coastal marshes west, northwest, and southwest of the project site (Hayward Shoreline, Roberts Landing, and the mouth of Alameda Creek), Garin Regional Park, and Fairmont Ridge (see pages 4.2-12 – 4.2-14 and **Air Quality** section for more details). Based on this analysis, staff determined that nitrogen deposition rates at biologically sensitive locations in the project vicinity would not substantially contribute to the adverse effects of nitrogen on plant communities, aquatic ecosystems, or special status species in the project vicinity.

CONCLUSIONS

Impacts to biological resources would be largely avoided because the proposed power plant site and laydown area currently contain very limited biological resources. Potential impacts to burrowing owls near the Eastshore Substation would be mitigated by the applicant's implementation of pre-construction field surveys and avoidance protocols, and potential impacts due to bird collisions with transmission lines would be mitigated by the installation of bird flight diverters. Staff recommends the adoption of the proposed biological resources Conditions of Certification to mitigate potential impacts to biological resources to less than significant levels.

CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall submit the resume, including contact information, of the proposed designated biologist to the compliance project manager (CPM) for approval.

Verification: The project owner shall submit the specified information at least 60 days before the start of any site (or related facilities) mobilization. Site and related facility activities shall not begin until an approved designated biologist is available on site.

The designated biologist must meet the following minimum qualifications:

1. A Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society such as The Ecological Society of America or The Wildlife Society; and

3. At least one year of field experience with biological resources found in the project area.

If a designated biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days before the termination or release of the preceding designated biologist.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The designated biologist shall perform the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities.

1. Advise the project owner's construction/operation manager and supervising construction and operations engineer on the implementation of the biological resources Conditions of Certification;

2. Be available to supervise or conduct mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources such as wetlands and special status species or their habitat;

3. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

4. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and

5. Respond directly to inquiries of the CPM regarding biological resource issues.

Verification: The designated biologist shall maintain written records of both the tasks described above and the summaries of these records. Both shall be submitted in the monthly compliance reports.

During project operation, the designated biologist shall submit record summaries in the annual compliance report.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The project owner's CPM - approved designated biologist shall submit the resume, at least three references, and the contact information for the proposed biological monitors to the CPM for approval. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

Biological monitor(s)' training by the designated biologist shall include familiarity with the Conditions of Certification and the biological resources mitigation implementation and monitoring plan (BRMIMP), worker environmental awareness program, and all permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days before the start of any site (or related facilities) mobilization. The designated biologist shall submit a written statement to the CPM confirming that individual biological monitors have been trained, including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days before their first day of monitoring activities.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-4 The project owner's construction/operation manager shall act on the advice of the designated biologist and biological monitor(s) to ensure compliance with the biological resources Conditions of Certification.

If required by the designated biologist and biological monitor(s), the project owner's construction operation manager shall halt all site mobilization, ground

disturbance, grading, construction, and operation activities in areas specified by the designated biologist.

The designated biologist shall:

1. Require a halt to all activities in any area when he or she determines that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities; and

3. Notify the CPM if there is a halt to any activities and advise the CPM of any corrective actions that have been taken, or will be taken, as a result of the work stoppage.

4. If the designated biologist is unavailable for direct consultation, the biological monitor shall act on behalf of the designated biologist.

Verification: The project owner shall ensure that the designated biologist or biological monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt to any site mobilization, ground disturbance, grading, construction, and/or operation activities. The project owner shall notify the CPM of the circumstances and actions taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

BIO-5 The project owner shall submit to the CPM for review and approval a copy of the final BRMIMP and, once approved, shall implement the measures identified in the plan.

Protocol: The BRMIMP shall identify:

a. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

b. All biological resource conditions included in the Energy Commission's final decision;

c. All locations, on a map of suitable scale, of areas requiring temporary protection and avoidance during construction;

d. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

e. Performance standards used to help decide if/when proposed mitigation is or is not successful;

f. All performance standards and remedial measures implemented if performance standards are not met;

g. A discussion of biological resource-related facility closure measures;

h. A process for proposing plan modifications to the CPM;

i. A discussion of bird flight diverters and how they will be installed, replaced, and maintained during the life of the project; and

j. Detailed descriptions of all measures that will be implemented to avoid and/or minimize impacts to special status species and reduce habitat disturbance.

Verification: At least 30 days before the start of any site mobilization activities, the project owner shall provide the CPM with the final version of the BRMIMP for the project and the CPM will determine the plan's acceptability. The project owner shall notify the CPM five working days before implementing any CPM-approved modifications to the BRMIMP.

Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and what mitigation and monitoring plan items are still outstanding.

WORKER ENVIRONMENTAL AWARENESS PROGRAM

BIO-6 The project owner shall develop and implement a CPM-approved worker environmental awareness program in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or related facilities during construction and operation, are informed about sensitive biological resources associated with the project.

The worker environmental awareness program must:

i. Be developed by the designated biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;

ii. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;

iii. Present the reasons for protecting these resources;

iv. Present the meaning of various temporary and permanent habitat protection measures; and

v. Identify whom to contact if there are further comments and/or questions about the material discussed in the program.

The specific program can be administered by a competent individual(s) acceptable to the designated biologist.

Each participant in the on-site worker environmental awareness program shall sign a statement declaring that the individual understands and shall abide by the guidelines set forth in the program materials. The person administering the program shall also sign each statement.

Verification: No fewer than 30 days before the start of any site mobilization activities, the project owner shall provide copies of the worker environmental awareness program and all supporting written materials prepared by the designated biologist and the name and qualifications of the person(s) administering the program to the CPM for approval. The project owner shall state in the monthly compliance report the number of persons who have completed the training in the prior month, and keep a record of all persons who have completed the training to date. The signed statements for the construction phase shall be kept on file by the project owner and made available for examination by the CPM for a period of at least six months after the start of commercial operation. During project operation, signed statements for active project operational personnel shall be kept on file for the duration of their employment and for six months after their termination.

IMPACT AVOIDANCE MEASURES

BIO-7 Anytime the project owner modifies or finalizes the project design, he or she shall incorporate all feasible measures that avoid or minimize impacts to the local biological resources, including the following:

1. Design, install, and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;

2. Design, install, and maintain transmission lines and all electrical components in accordance with the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines*: *The State of the Art in 2006*, to reduce the likelihood of the electrocution of large birds;

3. Eliminate any California exotic pest plants of concern (CalEPPC) List A species from landscaping plans;

4. Prescribe a road sealant that is non-toxic to wildlife and plants and use only fresh water when adjacent to wetlands, rivers, or drainage canals;

5. Design, install, and maintain facility lighting to prevent side casting of light; and

6. Install bird flight diverters at 5-meter intervals on aboveground transmission lines.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. The Designated Biologist shall report implementation of the measures in the Monthly Compliance Reports. Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

FACILITY CLOSURE

BIO-8 The project owner will incorporate into the planned permanent or unexpected permanent closure plan measures that address local biological resources. The biological resource facility closure measures will also be incorporated into the project BRMIMP.

Verification: At least 12 months (or a mutually agreed upon time period) before the beginning of closure activities, the project owner shall address all biological resource-related issues associated with facility closure in a biological resources element. The biological resources element will be incorporated into the facility closure plan and include a complete discussion of both local biological resources and proposed facility closure mitigation measures.

BIRD FLIGHT DIVERTERS

BIO-9 Bird flight diverters shall be placed on the overhead ground wire associated with the Eastshore transmission line. During construction of the transmission line, bird flight diverters shall be installed to the manufacturer's specifications. Energy Commission staff will provide the final approval of the bird flight diverter to be installed.

Verification: No fewer than 30 days before energizing the new Eastshore transmission line, the project owner will provide photographic verification to the Energy Commission CPM that bird flight diverters have been installed to the manufacturer's specifications. A discussion of how the bird flight diverters will be maintained during the life of the project will be included in the project's BRMIMP.

BURROWING OWL MITIGATION

BIO-10 Burrowing owl surveys shall be conducted before any ground disturbing activities. Survey methods shall be consistent with those described in the CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995), and shall include winter surveys (December 1 through January 31) and nesting season surveys (April 15 through July 15). If resident burrowing owls or active burrow nest sites are discovered within approximately 500 feet from proposed construction activities avoidance and mitigation measures outlined in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995) shall be implemented before performing ground-disturbing activities.

Verification: Survey results shall be provided to the CPM within 14 days for the completion of surveys. If burrowing owls are found on the project site, a report on the mitigation measures implemented and the results of those measures shall be provided to the CPM within 14 days of completion.

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CULTURAL RESOURCES

Testimony of Beverly E. Bastian[1]

SUMMARY OF CONCLUSIONS

With the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-7**, staff has determined that the Eastshore Energy Center (Eastshore) project would have no impact on significant archaeological resources, historic standing structures, historic districts, or ethnographic resources, and that the Eastshore project would be in conformity with all applicable laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the Eastshore project on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources are considered in this assessment: prehistoric, historic, and ethnographic.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Historic-period resources are those materials, archaeological and architectural, usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be more than 50 years old to be considered of potential historic importance. A resource less than 50 years of age may be historically important if the resource is of exceptional importance.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

For the Eastshore project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts from the proposed project using criteria from the California Environmental Quality Act (CEQA). Where significant impacts to significant cultural resources, both known and not yet discovered, cannot be avoided, measures to mitigate the adverse effects on or loss of the resources are proposed. The

[1] Energy Commission consultants John Dougherty and Cindy Baker, of PAR Environmental, contributed major portions of this document.

primary concerns are to ensure that all potential impacts to significant cultural resources are identified and that conditions are imposed on the project that would ensure that any significant impacts are reduced to a less than significant level.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws. For this project, in which there is no federal involvement,[2] the applicable laws are primarily state laws, in particular, CEQA. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies that would be required but for the Energy Commission's exclusive jurisdiction.

CULTURAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code, section 21083.2	The lead agency may require reasonable steps to preserve a unique archaeological resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA).
California Code of Regulations, Title 14, section 15064.5, subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner (or authorized representative) to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archaeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA Guidelines).

[2] Cultural resources in California are also protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

California Code of Regulations, Title 14, section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).
Public Resources Code 5024.1	The California Register of Historical Resources (CRHR) is established and includes properties determined eligible for the National Register of Historic Places (NRHP)(criteria: A. events, B. important persons, C. distinctive construction, and D. data); State Historic Landmark No. 770 and subsequent numbered landmarks; points of historical interest recommended for listing by the State Historical Resources Commission; and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR criteria are 1) events, 2) important persons, 3) distinctive construction, and 4) data.
Public Resources Code 5020.1 (h)	"Historic district" means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
East Alameda County Area Plan (May 5, 1994) Policy 127	This policy states that Alameda County shall identify and preserve significant archaeological and historical resources, including structures and sites which contribute to the heritage of East County.
East Alameda County Area Plan (May 5, 1994) Policy 128	This policy states that Alameda County shall require development to be designed to avoid cultural resources, or, if avoidance is determined by the County to be infeasible, to include [and] implement appropriate mitigation measures that offset the impacts.
East Alameda County Area Plan (May 5, 1994) Program 57	This County program requires a background and records check of a project area if a project is located within an extreme or high archaeological sensitivity zone as determined by the County. If there is evidence of an archaeological site within a proposed project area, an archaeological survey by qualified professionals shall be required as a part of the environmental assessment process. If any archaeological sites are found during construction, all work in the immediate vicinity shall be suspended pending site investigation by a qualified archaeology professional. Proposed structures or roads on property that contains archaeological sites should be sited in consultation with a professional archaeologist to avoid damaging the archaeological sites. The County shall follow Appendix K of the California Environmental Quality Act.

City of Hayward, Municipal Code, Chapter 10, Article 11, Sections 10-11.00 to 10-11.08	This ordinance specifies the procedures and criteria for the designation of historic structures, sites, and districts; the procedures or alteration or demolition of historic structures and sites; and the requirement and enforcement of the maintenance of historic structures by owners.

SETTING

REGIONAL SETTING

The project area is located 1.5 miles east of the eastern shore of San Francisco Bay, in the central part of the Coast Ranges Physiographic Province of California, at an elevation of about 25 feet above mean sea level. The local terrain is nearly flat, consisting entirely of alluvial deposits. The project area is zoned for industrial use (EEC 2006a: pp. 8.15-2 to 8.15-3). Another power plant project (Russell City Energy Center, Amendment No. 1) has been proposed for a location less than a mile from the Eastshore project and is currently under review for Energy Commission certification.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed Eastshore project would consist of a 115.5-megawatt (MW) power-generating facility located at 25101 Clawiter Road, 1.3 miles north of State Route 92, in the City of Hayward, Alameda County, California. The proposed project site consists of a 6.22-acre parcel that has been developed as an industrial facility, with a large existing structure. The remainder of the site has been paved with macadam or leveled and graveled. The facility would intertie with the PG&E Eastshore Substation via newly constructed or reconductored transmission lines (EEC 2006a: pp. 2-1 to 2-2).

The principal elements of the proposed project (EEC 2006a: pp. 1-2 to 1-3) include:

- Demolition of the existing site building, foundations, and paved surface on the 6.22-acre project site;
- grading of site and installation of new foundations, piping, and utility connections;
- installation of 14 nominal 8.4 MW (gross) Wartsila model 20V34SG natural gas-fired reciprocating engine-generator sets, each with a state-of-the-art air pollution control system and an approximately 70-foot tall stack;
- construction of an acoustically engineered main building enclosing all 14 engines;
- construction of a closed-loop cooling system consisting of multiple fan-cooled radiator assemblies outside of the main building;
- connection to pre-existing, on-site water and wastewater service pipelines;
- construction of an on-site 115-kV switchyard including switchgear and step-up voltage transformers;
- construction of an approximately 1.1-mile single-circuit 115-kV transmission line interconnecting to PG&E's Eastshore Substation;
- construction of an approximately 200-foot off-site natural gas pipeline connection to PG&E’s Line 153; and

- use of a 4.65-acre temporary construction laydown and parking area located immediately across Clawiter Road from the proposed Eastshore project site.

The proposed project site is presently occupied by a large industrial structure that was constructed in the mid-1960s. Prior to the 1960s the site was used for agriculture, with no structures or development (EEC 2006a: p. 8.3-2).

The construction laydown area is across the road and south of the project site, on a fenced, currently undeveloped parcel that would be leased from Berkeley Farms. On its east side, the proposed laydown area borders a working line of the Union Pacific Railroad (UPR) that was originally part of the historic Southern Pacific Coast Railway operation in the Bay Area (EEC 2006a: p. 2-3). While the map of the laydown area in the AFC shows the entire area between the railroad and Clawiter Road used for laydown (EEC 2006a: Fig. 2.2-7), the applicant indicated in the Data Response Workshop on January 29, 2007, that the project anticipated using only the area within the Berkeley Farms fence. The applicant later submitted a map showing that only the middle part of the fenced Berkeley Farms parcel would be used, avoiding the UPR right-of-way outside the fence, the northern part (or “apex”) of the triangular parcel, and the southern part (or “base”) of the triangular parcel, used by Berkeley Farms for truck parking.

A 115-kV radial transmission line, which would be constructed by PG&E, would interconnect the Eastshore project to PG&E's Eastshore Substation. The final route of this transmission line would be determined by PG&E at a later date, but the proposed route (designated Route 1) would exit the proposed project site at its northeast corner, run south on the east side of Clawiter Road, cross over State Highway 92, turn east on Eden Landing Road, then south on Production Avenue, then east on Investment Boulevard, then south again through a parking lot to enter the Eastshore Substation on its north side. Two alternate transmission line routes were considered (Routes 2 and 3), but dismissed as infeasible for either economic or engineering reasons (EEC 2006a: pp. 5-3; 5-6). Consequently, these routes are not further considered in this analysis.

Prehistoric Setting

Understanding the prehistoric archaeology of the region entails recognizing that the natural landscape was actively changing and developing during the recent geologic past. The most dramatic change in the regional geography during the period since the end of the Pleistocene Epoch (which preceded our own, the Holocene Epoch), approximately 11,000 years ago, was the formation of San Francisco Bay. During the height of Pleistocene glaciation, approximately 15,000 years ago, sea level is believed to have been as much as 128 meters (419 feet) below its present mean level, placing the Pacific coastline more than 35 miles west of the Golden Gate (c.f. Moratto 1984: p. 219, Fig. 6.2).

A discovery of human remains, made during construction of the San Francisco Civic Center Station of the Bay Area Rapid Transit (BART) system and sometimes referred to as BART Man, dramatically evidences the extent to which the area’s terrain has changed over time. These remains were found eight meters (26 feet) below modern sea level. Evidence collected from the bones and enclosing muck indicates that the body came to rest in a brackish marsh (Howard 1979:94; Moratto 1984:266). Other remains,

found on the bank of San Francisquito Creek on the Stanford University campus and known as Stanford Man 1 and Stanford Man 2, also illustrate geographic changes in the Bay Area. One set of remains was found 6.1 meters below the modern surface and has been dated to between 3,000 and 4,000 years Before the Present (B.P.). The other set of remains was found 5.2 meters below the surface and was dated to about 2,500 B.P. Collectively the BART and Stanford discoveries underscore the fact that the shorelines of the bay have been dynamically changing throughout the Holocene Epoch.

The oldest known human remains in the Americas were discovered in the San Joaquin Valley at Tulare Lake. These remains, consisting of human cranial fragments, were dated, using uranium series methods, to 15,696 years ago, with an error of 370 years (Federal Register 2005). This implies that a human population could have been active in California from the height of the Pleistocene Epoch onward. Because San Francisco Bay did not even exist when the first humans entered this region, there is a potential for the discovery of ancient, buried cultural remains anywhere in the Bay Area, both above and below modern sea level. As the BART and Stanford discoveries show, active sedimentation has so altered the landscape that many potential sites may be deeply buried, even inland from the present San Francisco Bay shore. Regional geology reveals that the project area is located on Holocene alluvial deposits (sediments) of less than 10,000 years of age (California 1990). It is notable that geologist describe one of the project area's local soils, designated "Quaternary Alluvial Fan deposits" (or "Qhaf"), as containing aboriginal artifacts and burials (Helley and Lajoie 1979: p. 33). Geologists have identified these Qhaf soils along the east side of Clawiter Road (EEC 2006a: Fig. 8.15-1).

Important sites in the Bay Area include the Emeryville shell mound (CA-ALA-309), the Ellis Landing site (CA-CCo-259), the Crocker Mound (CA-SFr-7), and others. Data from these sites have contributed significantly to archaeologists' development of California cultural chronologies (Beardsley 1954; Fredrickson 1973; Chartkoff and Chartkoff 1984; Moratto 1984; Fagan 2003).

The San Francisco Bay Area has a continuous prehistory extending back some 4,500 years, according to Moratto (1984: p. 184) and others (Fredrickson 1973), and archaeological research has been conducted in the Bay Area for more than a century, revealing an extensive and rich population of archaeological sites around the bay. The earliest documented cultural tradition in central California is the Early Bay or Lower Berkeley Pattern, beginning approximately 5,000 years B.P. Between roughly 2,500 and 2,200 years B.P., the succeeding Patterson Facies marks a transition to the Upper Berkeley Pattern. After extending its influence throughout much of central California, the Upper Berkeley Pattern ultimately gave rise to the Augustine Pattern, beginning about 1,500 years B.P. The Augustine Pattern is considered to mark the emergence of the ethnographic cultures of central California because the historically known populations of central California possessed cultural traits and practices that were continuations of Augustine Pattern developments.

Ethnographic Setting

At the time of historic contact, the San Francisco Bay region was occupied by the *Jalquin* or *Yrgin* (Milliken 1995: pp. 244-246). Based upon mission intermarriage records, anthropologist Milliken theorizes that the two names were either synonymous

or represented two neighboring groups with contiguous territories. Milliken found the *Jalquin* to be Bay Miwok speakers, while the *Yrgin* may have been Costanoan speakers. Costanoan is a *Utian* member of the Penutian language family, related to Miwok. Speakers of Costanoan are sometimes also referred to as Ohlone in the ethnographic literature. Some Costanoans, however, have objected to being referred to as Ohlone, because that was the name of a specific tribe whose territory was located along the Pacific coast of the San Francisco Peninsula.

Costanoan-speaking tribes employed a diverse pattern of subsistence and settlement practices adapted to their local territories and resources. Along the eastern shoreline of San Francisco Bay, immense shell mounds, such as the Emeryville Mound (CA-ALA-309), with interments and extensive middens, evidence major Native American settlements. The great quantity of oyster, clam, and mussel shells found in the Emeryville mound, where the lowest level was dated to over 2,000 years B.P., is evidence that Native American subsistence was based largely upon littoral resources, especially shell fish. An analysis of avian bone from the mound concluded that a sedentary, year-round occupation was reflected (Moratto 1984: pp. 229-230). Settlements in the interior probably relied on other food resources.

Historical Setting

After early Spanish exploration around San Francisco Bay in the late 1700s, Mission San Jose was established roughly 10 miles east of the shoreline, in a more protected area. In addition to building missions and a presidio in the Bay area, the Spanish government, and later the Mexican government, as well, made grants of large tracts of land to officials, former soldiers, and others, as a means of both encouraging settlement and strengthening control over the region. In 1840, a nearly 34,000-acre Mexican land grant named Rancho San Lorenzo was given to Guillermo Castro and Francisco Soto. Castro claimed the western 26,723 acres of this grant, which was later known as Soto San Lorenzito Rancho. The project area is located on this former land grant, but there is no evidence of development in the area during the Mexican period (Beck and Haase 1974: p. 30; EEC 2006a: p. 8.3-13).

California statehood and the California Gold Rush occurred almost simultaneously, leading to a great influx of gold seekers from the United States, but also from around the world. The San Francisco Bay region was the gateway port for the gold country, and its population swelled following the discovery of gold in 1848. In 1851, William Hayward built a home in Palomares Canyon as a squatter on Castro's rancho. In 1853, Joel Russell also claimed portions of the Soto San Lorenzito Rancho and built a home there. Castro asserted his prior ownership of the property, and, after the U. S. Land Commission confirmed Castro's claim, Hayward and Russell had to purchase from him the land on which they had squatted. Hayward bought 160 acres and founded Haywards (the original name for Hayward), incorporated in 1876. While Russell sold off much of the property he bought from Castro, he kept 320 acres of land between Hayward's Landing and Mt. Eden. Russell appears to have used the land for cattle range. Russell City was named for his son (EEC 2006a: p. 8.3-13; Sawyer and Watts 1978: pp. 11, 14; Thompson and West 1878: p. 24).

When Alameda County was established in 1853, Eden Township was surveyed, encompassing San Lorenzo, San Leandro, Haywards, and Mt. Eden. The shoreline

area of Eden Township consisted of marshlands intruded by numerous salt-water sloughs. The Mission San Jose Indians had harvested sea salt in the area during the mission era, presumably continuing a longstanding native tradition. Some of the more enterprising new Euro-American settlers soon converted the area marshlands to salt evaporation ponds. By 1854, John Johnston was operating the first commercial salt company in Alameda County. He was soon joined by many other small family operations (EEC 2006a:8.3-13; Sawyer and Watts 1978: pp. 11-12; Thompson and West 1878: pp. 23-24).

By the 1870s, the higher interior land had been divided into agricultural tracts ranging from 40 to 500 acres. The project area was part of a 500-acre parcel owned by Edward Clawiter, a German immigrant whose name is memorialized by the street running east of the proposed project site. Most of the surrounding properties were between 100 and 300 acres, making Clawiter's one of the largest in the area. He planted wheat and barley on his land. Clawiter had a smaller parcel (52 acres) in San Lorenzo, where he made his permanent residence (Sandoval 1988; Sawyer and Watts 1978: p. 11; Thompson and West 1878).

As agricultural and salt production increased, the demand for transportation followed. In 1878, the South Pacific Coast Railway Company (SPCRC) constructed a narrow-gauge railroad line between Oakland and Santa Cruz, running southeast to northwest through the east Bay Area. Locally, the tracks ran roughly midway between the little community of Mt. Eden and Eden Landing, a transbay shipping wharf on the north branch of Alameda Creek (later known as Eden Creek), one of several such facilities along the Hayward shoreline. Both passengers and freight soon traveled this route. On land purchased from Joel Russell, a small depot known as the Mt. Eden Station was constructed sometime between 1878, when the railroad was built, and 1906, when the depot first appears on any map, a California State Railroad Commission plat (Sawyer and Watts 1978: p. 12; Stock and Corbett 2000; CH2MHill 2007a: Response 23c).

Today the tracks that run adjacent to the east side of the proposed Eastshore project's laydown area are in the same location as the historic SPCRC tracks. The Mt. Eden Station, formerly located between the tracks and the proposed Eastshore project's laydown area, no longer exists, and no date for its demolition has been established. The SPCRC line was purchased by its larger competitor, the Southern Pacific Railroad (SP), in late 1886, and SP converted the tracks to standard gauge in 1906 (CH2MHill 2007a: Attachment CR-23A). Today, this rail line is owned and used by the UPR.

A 1906 United States Geological Survey (USGS) map for Hayward shows only sparse development in the area of the proposed Eastshore project. The little community of Mt. Eden included a scatter of buildings at the crossroads between Hayward and Eden Landing and the main north-south route to Oakland. Mt. Eden Station was also present, with a few other buildings near it (USGS 1899).

The Oliver Salt Company consolidated numerous smaller local salt operations in 1927. Leslie Salt then purchased the Oliver company in 1931. Vast commercial evaporating ponds came to dominate the land use along the shoreline. In the first several decades of the twentieth century, the interior orchard and farm land was increasingly divided into

smaller and smaller parcels, largely developed for industrial and some mixed residential use (Sandoval 1988; Sawyer and Watts 1978: p. 11).

During World War II, shipbuilding operations in Oakland and Alameda attracted hundreds of workers. Hayward was largely developed, gradually spreading west out of the foothills into the flat land approaching the shoreline. In the post-war years, increasing development throughout the region erased the agricultural character of the area and replaced it with industry and commerce. The large salt ponds were greatly expanded from previous ventures and covered hundreds of acres. Leslie Salt remained in business until 1992, when the East Bay Regional Park District took control of the shoreline area and began returning it to its natural state as the Hayward Regional Shoreline (Sandoval 1988; Sawyer and Watts 1978: p. 11; Stock and Corbett 2000).

Resources Inventory

Methods: Literature/Records Search and Native American Contacts

The applicant and Energy Commission staff reviewed technical literature and the lists and databases in which are recorded known historic resources, using a study area of 0.5 mile radius around the proposed plant site, and 0.25 miles out from the proposed linear facilities. Additionally, the applicant and Energy Commission staff contacted potentially interested Native Americans, as identified by the Native American Heritage Commission (NAHC). Records consulted include the files of the Northwest Information Center of the California Historic Resources Information System (CHRIS); the NAHC sacred lands files; the Historic Property Directory, the California Inventory of Historical Resources, and the National Register of Historic Places (NRHP) at the State Office of Historic Preservation (SHPO); the City of Hayward's Historic Property List; and the files of the Hayward Area Historical Society (EEC 2006a: p. 8.3-14; CH2MHill 2007a: Responses 19 and 20). Both the applicant and staff reviewed historic maps showing the project area (Thompson and West 1878, GLO 1857, USGS 1899/1906, USWD 1942).

Methods: Field Surveys

Defining the potential impact area of the Eastshore project as the "immediate project site and corridors extending 50 feet to either side of the ... linear utility centerlines," Clint Helton, a qualified archaeologist serving as a consultant to the applicant, conducted a pedestrian survey of the proposed project site, the entire laydown area, and the chosen transmission line route (Route 1) on July 25, 2006. Routes 2 and 3, the two alternate transmission line routes, were not surveyed for cultural resources. The ground visibility at the proposed project site and along the chosen transmission line route was poor, due to the presence of existing structures and paving. Visibility at the laydown area was better, but still obscured by grass and weeds. Mr. Helton used 30-meter-wide transects to survey the proposed project site and laydown area. No archaeological resources were identified. Mr. Helton also conducted a "drive-by" architectural reconnaissance of the potential impact area on July 25, 2006, but identified no significant buildings or structures (EEC 2006a: pp. 8.3-16 to 8.3-17).

Energy Commission staff had noted that the 1899/1906 USGS "Haywards" quadrangle showed the Mt. Eden train station next to the (then) Southern Pacific railroad tracks, in a location that appeared to be within the area proposed by the Eastshore project applicant

as the project's laydown area. Consequently, staff visited the laydown area (outside of the Berkeley Farms fence) on January 23, 2007, and attempted to determine whether there were any archaeological remains of the Mt. Eden Station, and, if so, whether the proposed project would affect those remains. On January 29, 2007, staff revisited the laydown area, drove along the chosen transmission line route, and attempted to view several known and recorded historic-period archaeological sites at the south end of Eden Landing Road, but could not gain access.

A geotechnical exploration at the proposed project site, conducted by the applicant on July 11-12 and July 13, 19, and 20, 2006, was intended to provide soil condition data to aid in the design of the Eastshore project's foundations. The study consisted of seven Cone Penetrometer Tests, pushed to a depth of 50 to 80 feet below the existing grade, and two borings, drilled to a depth of about 50 feet below the existing grade, placed to correspond to the locations of proposed equipment. The two borings were located within the existing building, where the two groupings of Wartsila engines would be placed (CH2MHill 2007a, Attachment GR-28: pp. 2, 4).

Findings: Prehistoric and Historic Archaeological Resources Identified and Evaluated for Historical Significance

The review of records and historic sources identified only one possible archaeological resource within or immediately adjacent to the proposed Eastshore project site, laydown area, and transmission line route. Historic maps indicated that the archaeological remains, if any, of the Mt. Eden Station were probably on or near the proposed project laydown area. In response to a staff Data Request, the applicant supplied additional historical data on the Mount Eden Station that indicated that the station had been located on the west side of the tracks, but did not pinpoint its exact location (CH2MHill 2007: Attachment CR-23B). From this historical data, Energy Commission staff at first thought that the station could have been located within the proposed Eastshore laydown area, inside the Berkeley Farms fence. Staff's field survey suggested, instead, that any archaeological remains, if extant, were probably located within the UPR right-of-way, immediately to the east of the proposed laydown area and outside the Berkeley Farms fence. Because neither the applicant nor staff was able to definitively locate any remains of the Mt. Eden Station, this potential resource was not evaluated for California Register of Historical Resources (CRHR) eligibility.

At the time of the second staff field visit to the laydown area, staff noted what appeared to be a whiteware ceramic fragment in rodent-burrow back-dirt near the northern apex of the triangular laydown parcel. Staff was not able to examine the sherd, so the sherd cannot be reliably attributed to the historic rather than the modern period. Nonetheless, the sherd could indicate historic-period use of the northern part of the laydown area. Historic photographs additionally provide evidence indicating that the land west of the station, possibly within the northern part of the laydown area, might have been used historically for non-agricultural purposes. Rooflines of a two-story house and a small shed-like structure can be seen beyond some shrubbery to the west of the station in a photograph attributed to *circa* 1930, and a clothesline loaded with laundry appears to the west of the station in a photograph attributed to *circa* 1940 (CH2MHill 2007a: Attachment 23B). This evidence of the possible use of the northern part of the Berkeley

Farms parcel as a domestic backyard suggests that buried archaeological remains, such as trash pits or a trash-filled privy, could be present there.

The applicant's geotechnical study revealed three major layers of soils beneath the proposed locations of the two Wartsila engine banks. The first was identified as a very dense clay and gravel fill, with a thickness of 5.0-6.5 feet. Below that lay native soils consisting of two thick layers of clay interspersed with sand lenses. The other finding of interest from the perspective of cultural resources was the observation that two Core Penetrometer Tests attempted near the northwest corner of the existing building and spaced about 10 feet apart could not be completed after encountering something impenetrable. The borings were not observed by an archaeologist, but staff's review of the boring logs failed to identify soils consistent with cultural deposits (CH2MHill 2007a, Attachment GR-28: pp. 2, 4; Boring Logs 1 and 2).

Based on the negative results of both the archaeological literature search and the field survey for archaeological deposits, no assessment of the impacts to known, significant archaeological resources from the construction and operation of the Eastshore project would be required.

While the negative findings of the applicant's archaeological survey and the lack of indications of human activities in the borings of the geotechnical study seem to indicate that the possibility of encountering buried archaeological remains is small, the presence of known deeply buried prehistoric deposits in similar East Bay geologic environments suggests that that possibility is not nil.

Findings: Historic Structures Identified and Evaluated for Historical Significance

The literature search identified one known historic resource, the Eastshore-Grant Transmission Line (Primary Number 01-002269) in the vicinity of the proposed project. This transmission line was constructed by PG&E in 1921 and 1922. The recorder and evaluator in 2001 recommended that this resource was not eligible for the CRHR because it is neither innovative in engineering terms nor rare, and its integrity of setting, feeling, and association have been compromised (EEC 2006a, Appendix 8.3C).

From a review of historic maps, staff identified the former SPCRC line as a potentially significant historic standing structure. In response to staff Data Requests, the applicant had JRP Historical Consulting compile Department of Parks and Recreation (DPR) "Primary," Building, Structure, and Object," and "Linear Feature" forms for the extant UPR line. The UPR line was originally constructed in 1878 by the South Pacific Coast Railway Company, was purchased by the Southern Pacific Railroad Company in 1886, then purchased by UPR in 1996. The JRP recorder and evaluator of this resource recommended that it was not eligible for the CRHR because it does not meet any of the criteria for eligibility for that register (CH2MHill 2007a: Attachment 23A).

No standing structures either on or near the proposed Eastshore project site, laydown area, or transmission line route have been recommended as eligible for the CRHR, so no assessment of the impacts from the construction or operation of the proposed Eastshore project to this class of cultural resources would be required.

Findings: Ethnographic Resources Identified and Evaluated for Historical Significance

In response to a letter sent on June 28, 2006, the NAHC informed the applicant, on August 3, 2006, that no known Native American cultural resources in the project area were found in the NAHC's sacred lands database. On August 16, 2006, the applicant sent out letters (with maps of the project) to eight Native American individuals or groups identified by the NAHC as concerned about development projects in Alameda County. The letter asked those Native Americans to contact the applicant if they had any concerns regarding cultural resources in the project area. Additionally, on January 3, 2007, the applicant followed up the initial letters with telephone calls to the eight previously contacted Native American individuals or groups. From these outreach efforts, the applicant received four responses from Native Americans. Two representatives of the Ohlone Tribe, one from the Amah/Mutsun Tribal Band, and one from the Marine Ruano Family all stated that they have neither knowledge of nor concerns about cultural resources in the vicinity of the proposed project site. (EEC 2006a: p. 8.3-18; CH2MHill 2007a: Responses 26 and 27; Attachment CR 27).

On November 3, 2006, Energy Commission staff also obtained from the NAHC the names and addresses of Native Americans interested in the Alameda County area. On November 16, 2006, staff sent letters to eight Native Americans, informing them of the project and asking that they contact staff if they had any concerns about the project's potential effects on cultural resources. No responses were received.

Absent communications with Native Americans that disclose significant sites of ethnographic concern, staff concludes that no significant ethnographic sites have been identified that must be considered when evaluating the impacts of the construction of the Eastshore project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires that the Energy Commission evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

The CEQA Guidelines provide a definition of a historical resource as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR," or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1 (g) of the Public Resources Code," or "any object , building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal Code Regs, tit. 14, § 15064.5(a)). Historical resources that are automatically listed

in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward (Pub Resources Code, § 5024.1(d)).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[3] a resource must meet at least one (and may meet more than one) of four criteria (Public Resources Code section 5024.1).

- Criterion 1: the resource is associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion 2: the resource is associated with the lives of persons significant in our past.
- Criterion 3: the resource embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values.
- Criterion 4: the resource has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal Code of Regs, tit. 14, § 4852(c)).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Pub Resources Code §§ 5020.1 (j) or 5024.1. Whether a proposed project would cause a substantial adverse change in the significance of historical resources is the issue that staff analyzes to determine if the project may have a significant effect on the environment. The significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact will change those integrity appraisals.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing

[3] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

structures when those structures must be removed to make way for new structures or when vibrations from construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components because of increased accessibility. Similarly, historic structures can suffer indirect impacts when project construction increases accessibility and weather exposure, such that vandalism and accelerated weathering can ensue.

Ground disturbance from construction at the proposed project site, along the proposed linear facility routes, and at the proposed laydown area could potentially directly impact archaeological resources, as yet unidentified. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project.

Construction Impacts and Mitigation

Identification and Assessment of Direct Impacts on Archaeological Resources

The applicant's records search revealed no previously recorded archaeological sites located within the study area, defined as the immediate project site and corridors extending 50 feet to either side of the linear utility centerlines. Contacted Native Americans also disclosed no archaeological sites in the area. The applicant's field survey of the defined study area similarly found no archaeological resources. Staff therefore agrees with the applicant that construction impacts from the Eastshore project would affect no known archaeological resources (EEC 2006a: p. 8.3-18), and consequently, no mitigation would be required for known archaeological resources.

Because, however, the proposed project development, and construction generally, require subsurface disturbance of the ground, and because area soils are known to contain cultural materials (as indicated in the sections on prehistoric, ethnographic, and historic settings), the applicant and staff agree that Eastshore project has the potential to adversely affect as yet unknown buried archaeological resources in those locations where project-related excavations for foundations or underground utilities would be undertaken (EEC 2006a: p. 8.3-19). The possibility of prehistoric deposits is suggested by the resources-rich nature of the marshy prehistoric landscape and by the geologic landform—an alluvial plain, which could mask prehistoric archaeological remains under deposited sediments—on which the proposed Eastshore project would be built. If any newly found archaeological resources are eligible for the CRHR, the direct impacts from construction could materially impair the resources. Staff anticipates the following types of direct impacts to potential but as yet undiscovered archaeological deposits:

- In addition to the project removing the existing building and pavement at the proposed project site, the applicant's geotechnical study indicated that five or more

feet of “dock high fill” would be removed from beneath the existing building where the two Wartsila engine banks would be installed. The engine banks would require a foundation of substantial load-bearing capacity. The geotechnical study offered several alternative methods of constructing an adequate foundation in the compressible native soils that underlie the proposed engine bank locations. One of these methods would be to remove, on average, 16 feet of the native soils, moisture-condition them, then replace and compact them. Another method, and the one recommended for construction of the engine bank foundations, would be to install Geopiers, topped with shallow footings. This involves drilling 30-inch-diameter holes, up to 20 feet deep and spaced evenly under the engine bank areas, backfilling the holes with rammed aggregate, and forming the footings on top of the Geopiers (CH2MHill 2007a, Attachment GR-28: pp. 6-8). Either of these approaches to constructing the foundations of the engine banks would entail digging down through undisturbed, native soils to a depth as great as 20 feet. Consequently, foundation-related excavations in the areas of the Wartsila engine banks could directly impact buried archaeological resources, unidentified at this time, which could be present in the native soils of the site. The removed soils from the site would be either reused on-site (CH2MHill 2007a, Attachment GR-28: p. 11), disposed of at other, nearby construction sites, or sent to an existing professionally managed soil repository in the area (CH2MHill 2007a, Response No. 25). Therefore, neither approach to the engine bank foundations would result in potential impacts to off-site archaeological resources.

- The 4.5-inch-diameter, 200-foot-long, underground natural gas pipeline that would connect to a PG&E natural gas service line would be installed by means of horizontal directional drilling (HDD), running under both Clawiter Road and the UPR tracks and right-of-way. The HDD construction technique would entail the excavation of two six-by-ten-foot bore pits (or bell holes), each five feet deep, and a 50-foot-by-225-foot laydown/weld-up area. One bore pit would be required on the proposed project site, just west of the location of the natural gas metering station. The other bore pit would be in the right-of-way for PG&E’s natural gas pipeline 153, located in the parking lot of a large commercial building, east of the UPR right-of-way. The pipe laydown/weld-up area would extend to the west of the western bore pit, but does not entail excavation (Eastshore2006a: pp. 6-1 to 6-3; Fig. 6.1-1). The installation of this pipeline could directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the HDD bore pit excavations.
- The 30-foot-by-50-foot metering station, located on the eastern margin of the proposed project site parcel, would consist of gas-conditioning, pressure-regulating, and metering equipment and above- and below-ground piping (EEC 2006a: p. 6-3). The installation of this station could directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavations for the underground piping.
- Construction of the approximately 1.1-mile single-circuit 115-kV overhead transmission line interconnecting to PG&E's Eastshore Substation and running south from the project site on Clawiter Road would entail erecting new steel or wood poles between the existing poles within the right-of-way of PG&E’s 12-kV distribution line on the east side of Clawiter Road, and, additionally, removing some of the old 12-kV poles (EEC 2006a: p. 5-3). Excavation for the addition or removal of poles in the

PG&E right-of-way could directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavations for the addition of new poles or the removal of old ones.

- The trench dimensions and routes of the proposed project's connections to pre-existing, on-site water and wastewater service pipelines are not discussed or shown on maps in the AFC (EEC 2006a: sections 2.0 and 7.0). Certainly the existing service pipelines are in already disturbed soils, but the new pipelines connecting the project to them would require trenches excavated into undisturbed native soils. The installation of these new on-site pipelines could directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the trench excavations for the pipelines.
- Preparation of the 4.65-acre temporary construction laydown and parking area for proposed project use would entail removal of the surface vegetation, application of fill to raise the grade to a uniform level, and application of two inches of crushed rock (CH2MHill 2007a: Response No. 24b). The removal of vegetation by machine could result in the removal of as much as the top 10 inches of soil, as well. There are no data on the nature of the soils present in the laydown area. If they are fill soils, vegetation removal would have no impact on buried archaeological resources. But if the surface consists of native soils, vegetation removal could directly impact surface and shallowly buried archaeological resources, unidentified at this time.

In recognition of the possibility that prehistoric and historic archaeological deposits could be encountered during construction, CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and the project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Public Resources Code, section 21083.2; California Code of Regulations, Title 14, sections 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and possibly mitigating impacts to newly discovered archaeological resources be put in place by means of conditions of certification to reduce those impacts to a less than significant level.

In the same vein, the applicant has suggested a number of mitigation measures (EEC 2006a: 8.3-19), including:

- Having a designated cultural resources specialist (CRS) who would be on call to investigate any archaeological deposits encountered during construction;
- Implementing a construction worker training program;
- Monitoring during the initial clearing of the proposed project site and during excavations at the project site;
- Having procedures for halting construction in the vicinity of an inadvertent archaeological discovery of human remains;
- Having procedures for evaluating the significance of inadvertent archaeological discoveries made during construction; and
- Having procedures to mitigate adverse impacts to any significant archaeological discoveries.

Although staff concurs with many of the applicant's suggested mitigation measures, staff has added additional recommendations or expanded upon the applicant's suggestions to ensure that all impacts to cultural resources are mitigated to below the level of significance. The applicant's suggested mitigation measures and staff's additional recommendations are incorporated into the proposed conditions of certification (**CUL-1** through **CUL-7**, below). Staff's additions include having an archaeologist monitor not just construction activities on the project site but along the transmission line route and at the HDD bore pits, as well, and having a Native American monitor construction activities anywhere prehistoric cultural resources are discovered. Staff's proposed mitigation measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during construction ensure that impacts to significant archaeological discoveries would be mitigated to a less than significant level.

The applicant's comments, provided on September 19, 2007, on the cultural resources conditions of certification proposed in the Preliminary Staff Assessment (PSA) consisted of just a request that a phrase be added to all time lines in the conditions, as follows: "or fewer days if mutually agreed between project owner and CPM." In response, staff notes that no time lines specified in the cultural resources conditions of certification preclude the early completion of the various tasks and requirements. No changes to the language of the conditions is needed to accommodate the applicant's expressed concern for an expedited compliance process.

Identification and Assessment of Direct Impacts on Historic Standing Structures

Neither the applicant nor staff identified any direct impacts to any known historic structures in the impact area of the proposed project. No additional historic structures are likely to be discovered, so no mitigation measures for impacts to historic structures are required.

Identification and Assessment of Direct Impacts on Ethnographic Resources

No ethnographic resources have been identified by the Native American community to either the applicant or to Energy Commission staff. Therefore no direct impacts to ethnographic resources have been identified, and no mitigation measures for direct impacts to ethnographic resources are required.

Indirect Impacts

Neither the applicant nor staff identified any indirect impacts to any identified cultural resources in the impact area of the proposed project, and so no mitigation measures for indirect impacts would be required for any class of cultural resources.

Operation Impacts and Mitigation

During operation of the proposed power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. Thus, such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed for mitigating impacts to previously unknown archaeological resources during the construction of the plant and linear facilities would

also serve to mitigate impacts from repairs made during operation of the plant (see **CUL-1** through **CUL-7**, below).

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

One future industrial project is planned for the vicinity of the proposed Eastshore project location. A 600-MW power plant, the Russell City Energy Center (RCEC), Amendment No. 1 (01-AFC-7C), has been approved by the Energy Commission for a location about 3,000 feet southwest of the Eastshore project. Cumulative impacts to cultural resources in the project vicinity could occur if the RCEC and the proposed Eastshore project, had or would have impacts on cultural resources that, considered together, would be significant.

The impacts to cultural resources of the RCEC project and of the Eastshore project were analyzed by staff and found to be not significant, with the implementation of conditions of certification providing for identification, evaluation, and avoidance or mitigation of impacts to significant cultural resources discovered during the construction of these projects.

Proponents of current and future projects can mitigate impacts to as yet undiscovered subsurface archaeological sites to less than significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP). Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code § 5097.98. Since the impacts from the Eastshore project would be mitigated to a level less than significant by the project's compliance with Conditions of Certification **CUL-1** through **CUL-7**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect any incremental effects of the Eastshore project to be cumulatively considerable, when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If the Conditions of Certification (below) are properly implemented, the proposed Eastshore project would result in a less than significant impact on known and newly found cultural resources. The project would therefore be in compliance with CEQA and the other applicable state laws, ordinances, regulations, and standards listed in Table 1.

The County of Alameda's General Plan has general language promoting the county-wide preservation of cultural resources, and the City of Hayward has an ordinance which promotes the identification and preservation of historic structures, sites, and districts. Staff's recommended conditions of certification require specific actions to not just promote but to effect historic preservation and mitigate impacts to all significant

cultural resources in order to ensure CEQA compliance. Consequently, if the proposed Eastshore project implements these conditions, its actions would be consistent with the general historic preservation goals of the County of Alameda and of the City of Hayward.

RESPONSE TO PUBLIC COMMENTS

At the Energy Commission's Preliminary Staff Assessment Workshop, held on September 6, 2007 in Hayward, a Native American, who identified herself as Miwok, asked the following questions:

- Were any Miwoks contacted about the Eastshore project?
- Has the project site been surveyed for Native American burials?
- What was the historical use of the project site before plant construction?

In response, staff notes that among the persons notified about the Eastshore project by both the applicant and staff were persons whose stated affiliation was Miwok, and they either did not respond or expressed no concern about Native American cultural resources on the proposed project site, as discussed in the PSA and, above, in this Final Staff Assessment (FSA), under the heading, "Findings: Ethnographic Resources Identified and Evaluated for Historical Significance." Also, the proposed project site was surveyed for cultural resources by the applicant, as discussed in the "Methods: Field Surveys" section of the PSA and FSA, and the records of known Native American archaeological sites in the area one-half mile around the project site were reviewed by the applicant, as discussed in PSA and FSA section, "Methods: Literature/Records Search and Native American Contacts." Neither the field survey nor the records review indicated Native American burials on or near the proposed plant site. The historical use of the plant site was discussed in the PSA and FSA section entitled, "Project, Site, and Vicinity Description."

CONCLUSIONS AND RECOMMENDATIONS

The applicant and Energy Commission staff have identified no known cultural resources or historic structures that would be affected adversely or otherwise by the Eastshore. There does remain a potential to encounter unanticipated, as yet unrecorded resources during ground-disturbing excavation and construction activities. The applicant and Energy Commission staff have developed a series of measures that should reduce the adverse effects of the project upon as yet undiscovered significant resources. These recommendations are outlined below.

Staff recommends that the Commission adopt cultural resources Conditions of Certification **CUL-1** through **CUL-7**. These measures are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant impacts from the project on any discovered resources assessed as significant. To accomplish this, the conditions provide for the hiring of a cultural resources specialist and archaeological monitors, for cultural resources awareness training for construction workers, for the archaeological and Native American monitoring of ground-disturbing activities, for the recovery of data

from significant discovered archaeological deposits, for the writing of a technical archaeological report on all archaeological activities and findings, and for the curation of recovered artifacts and other data. When properly implemented and enforced, staff believes that these conditions of certification would reduce to less than significant any impacts to previously unknown cultural resources encountered during construction and operation of the proposed Eastshore power plant. Additionally, with the adoption and implementation of these conditions, the proposed project would be in conformity with all applicable LORS.

CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternates, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility to the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner (Discovery). No preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; or construction shall occur prior to CPM approval of the CRS, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for non-compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field; and

2. At least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California.

The resume of the CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS on referenced projects, and demonstrate that the CRS has the appropriate education and experience to accomplish the cultural resources tasks that must be addressed during ground disturbance, grading, construction, and operation.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS
The resume(s) of any additional technical specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural documents, field notes, photographs, and other cultural materials generated by the project.

3. At least 20 days prior to preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the CRS shall provide a letter naming any CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.

4. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources Conditions.

CUL-2 Prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, if

the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction activities shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings, not previously provided, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall provide the AFC, data responses, and confidential cultural resources documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction for those changes.

3. If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.

4. On a weekly basis during preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, email, or fax.

5. Within five days of identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall be provided in the Archaeological Resource Management Report (ARMR) format, and, per ARMR guidelines, the author's name shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site construction manager. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design will be prepared for any resource where data recovery is required.

2. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The Conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the Conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact-avoidance measures (such as flagging or fencing), to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.

7. A statement that all cultural resources encountered shall be recorded on a State of California Department of Parks and Recreation DPR-523 form, mapped and photographed. In addition, all archaeological materials collected as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees and a copy of an agreement with, or other written commitment from, a curation facility to accept artifacts from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resources materials encountered during construction.

10. A description of the contents and format of the Cultural Resources Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the subject CRMMP to the CPM for review and approval. Preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction may not commence until the CRMMP is approved, unless specifically approved by the CPM.

2. At least 30 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, DPR-523 forms, and additional research reports not previously submitted to the California Historical Resources Information

System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected.

3. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-5 Prior to and for the duration of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Samples or visuals of artifacts that might be found in the project vicinity;

3. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a Discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources Discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

5. An informational brochure that identifies reporting procedures in the event of a Discovery;

6. An acknowledgement form signed by each worker indicating that they have received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of pre-construction site mobilization, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

2. On a monthly basis, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction full time, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner (Discovery), anywhere there is excavation into undisturbed native soils on the plant site, at the HDD bore pits, and at each location where a new transmission line pole is installed or an old transmission line pole is removed along the transmission line route.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all native-soil–removing activities on the construction site or along the linear facility routes for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least one monitor per excavation area where machines are actively removing native soils. If an excavation area is too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area.

In the event that the CRS determines that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended. The CRS or alternate CRS shall report daily to the CPM on the status of cultural resources-related activities at the construction site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff (Staff).

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts have been discovered. Informational lists of concerned Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log. While monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS.

2. Daily, the CRS shall provide a statement that “no cultural resources over 50 years of age were discovered” to the CPM as an e-mail, or in some other form acceptable to the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily

reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.

3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a Discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources over 50 years of age or considered exceptionally significant are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the Discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until the CRS has visited the Discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the Discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility, and recommendations for mitigation of any cultural resources Discoveries, whether or not a determination of significance has been made.

2. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The “Description” entry of the 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.

3. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the Discovery and approved the CRS’s proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt construction activities in the vicinity of a cultural resources Discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Completed DPR form 523s shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever is more appropriate for the subject cultural material.

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HAZARDOUS MATERIALS MANAGEMENT

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

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Eastshore Energy Center (Eastshore), along with staff's proposed mitigation measures, indicates that hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., Eastshore Energy, LLC (applicant) would be required to develop a risk management plan. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Hazardous Materials Division of the Hayward Fire Department and Energy Commission staff. In addition, staff's proposed conditions of certification require that both the and staff review and approve the risk management plan prior to delivery of any hazardous materials to the Eastshore project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed Eastshore project has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes applicable requirements for the protection of workers from these risks.

Aqueous ammonia (19 percent ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the Eastshore project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (EEC 2006a, Table 8.12-4). Aqueous ammonia will be used to control oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with the use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied gas at high pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to

contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, corrosion inhibitors, and catalyst panels, will be present at the proposed Eastshore project. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used on site during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. Natural gas will be delivered through a new 200-foot long gas pipeline connecting to PG&E's existing natural gas transmission No. 153 pipeline 765. PG&E will interconnect the project by installing a 4.5-inch outside diameter pipeline through an underground bore originating at the project site, boring under Clawiter Road and the existing Union Pacific Rail Road right-of-way (ROW), and connecting to PG&E's existing gas line (EEC 2006a, Section 2.1). The Eastshore project will also require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r)	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.

49 CFR 172.800	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security (DHS) that requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to 515	Sets forth requirements for the design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
California Health	Requires that “No person shall discharge from any source whatsoever

and Safety Code, section 41700	such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity to be discharged into sources of drinking water.
Local	
City of Hayward, municipal code, Chapter 3, Article 8	Requires entities that store or handle hazardous materials or wastes to apply for a hazardous materials storage permit through submittal of a HMBP that includes an inventory of hazardous materials, a contingency plan, and a training plan.

The certified unified program authority (CUPA) with the responsibility to review RMPs and hazardous materials business plans is the City of Hayward Fire Department (HFD) Hazardous Materials office. With regard to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of CCR Title 24 and 2001 California Building Code (EEC 2006a Section 2.3.1).

SETTING

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

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

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the **Air Quality** section (8.1) and **Appendix 8.1** of the Application for Certification (AFC) (EEC 2006a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and the highest recorded temperature in the project area in the past three years are appropriate for conducting the offsite consequence analysis (EEC 2006a Section 8.12.5). Staff believes these represent a reasonably conservative scenario and therefore reflect worst-case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The topography of the project site is essentially flat (about 23 feet above sea level), as are elevations to the north, west, and south. Elevations to the east tend to increase gradually toward the East Bay foothills (EEC 2006a, Section 2.2). Beginning 3.4 miles to the east, terrain above stack height ranges up to 625 feet in elevation.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. Sensitive receptors in the project vicinity are listed in **Table 8.1D-4** and shown in **Figure 8.1D-2** (EEC 2006a, Appendix 8.1D). The nearest sensitive receptor is Eden West Convalescent Hospital. In addition, Ochoa Intermediate School, Courtyard Care Center, and Eden Gardens Elementary School are located approximately 0.7 mile from the site. Two hospitals, Kaiser Foundation Hospital and St. Rose Hospital, are located approximately 1.6 miles from the site (EEC 2006a Section 8.12.3). Sensitive receptors within a 6-mile radius of the Eastshore site are provided in the EDR report as **Attachment 8.1D-2.** It also contains a description of the receptors.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can

prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (EEC 2006a, Section 8.12). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in **Table 8.12-3** of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading, and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, the only hazardous materials proposed for use are paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, and welding flux. Any impact of spills or other releases of these materials will be limited to the site because of the small quantities involved, their

infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as biocides, cleaning agents, lube oil, sulfuric acid in batteries, and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at Eastshore) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and aqueous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of the FSA as per staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but can explode under certain conditions (as demonstrated by the recent natural gas detonation in Belgium in July 2004).

While natural gas will be used in significant quantities, it will not be stored on site. It will be delivered via an underground lateral, owned by PG&E, that connects to PG&E Line 153. The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start up, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas, and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

Aqueous Ammonia

Aqueous ammonia will be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the Eastshore project. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. Eastshore will have 19-percent aqueous ammonia solution in two stationary above-ground storage tanks each with an approximate 10,000 gallon capacity (EEC 2006a Section 8.12.4.2).

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose the risk of off-site impact. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that will be used and stored on site. However, the use of aqueous ammonia poses far less risk than the use of the far more hazardous anhydrous ammonia (ammonia that is not diluted with water).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses four bench mark exposure levels of ammonia gas occurring offsite. These include:

1. the lowest concentration posing a risk of lethality, 2,000 ppm;

2. the immediately dangerous to life and health level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by US EPA and California; and

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm (considered by staff to be a level of significance).

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Section 8.12.5 and **Appendix 8.12A** of the AFC (EEC 2006a) describe the modeling parameters used for the worst-case accidental releases of aqueous ammonia in the applicant's off-site consequence analysis (OCA). The OCA was conducted by the applicant and submitted as a response to a staff data request (CH2MHill 2007a). It was based on the final design configuration of the Eastshore project's ammonia storage tanks and secondary containment structure. It considered tank size, surface area of the containment structure, location of the storage area relative to potential off-site receptors, local climatology, and the type of release. Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do not apply to sources that store or use aqueous ammonia solutions below 20 percent), the OCA

was performed for the worst-case release scenario, which involved the failure and complete discharge of one of the two storage tanks, as well as an alternative release scenario. Ammonia emissions from two potential release scenarios were calculated following methods provided in the RMP off-site consequence analysis guidance, US EPA, April 1999. The default meteorological data necessary for emission and dispersion calculations was supplemented by daily temperature data as required by CCR Title 19, section 2750.2. The maximum temperature recorded in the area in the past three years was used for emission and dispersion calculations. Potential off-site ammonia concentrations were estimated using the SLAB numerical dispersion model.

Results from the OCA were tabulated showing the distance from the source release point to the downwind concentrations of 150 ppm and 75 ppm for both release scenarios. The potential area of ammonia concentrations above these values resulting from the worst-case release scenario was shown in a figure drawn to scale, which shows the ammonia storage location, the proposed Eastshore project, and any nearby off-site sensitive receptors.

Hazardous Materials Management Table 2 shows the applicant's modeled distance to the four benchmark criteria concentrations at an elevation of 5.25 feet above ground level.

HAZARDOUS MATERIALS MANAGEMENT Table 2
Distance to EPA/CalARP and CEC Toxic Endpoints
(source: Table 2 of Eastshore Data responses 1-15-07)

Scenario Distance in Feet to 2,000 ppm	Distance in Feet to IDLH (300 ppm)	Distance in Feet to AIHA's ERPG-2 (150 ppm)	Distance in Feet to CEC level (75 ppm)
~41	~44	~45	~46

Staff conducted its own independent modeling and found significant differences between its own results and those found by the applicant (see **Hazardous Materials Management Table 3)**. Staff found that with an uncovered secondary containment structure, a spill of aqueous ammonia would result in impact to the off-site public because of the migration of ammonia vapors. Staff estimated that the distance to the level of insignificant impact (75 ppm ammonia in air) could be as great as 1,181 feet (a little over two blocks).

HAZARDOUS MATERIALS MANAGEMENT Table 3
Distance to EPA/CalARP and CEC Toxic Endpoints (source: staff modeling)

Scenario Distance in Feet to 2,000 ppm	Distance in Feet to IDLH (300 ppm)	Distance in Feet to AIHA's ERPG-2 (150 ppm)	Distance in Feet to CEC level (75 ppm)
~194	~553	~804	~1181

Staff cannot explain the discrepancy between its modeling results and those of the applicant. Staff believes that since the potential impact would be significant, mitigation is required and that the implementation of standard engineering controls used at most other Energy Commission-certified power plants would be adequate mitigation. The use of a subsurface

vault to contain the spilled aqueous ammonia, or the placement of a cover on the top of the secondary containment structure, would each limit the surface area of the aqueous ammonia pool, thus limiting the rate of vapor loss from the pool. This then reduces the potential impact to insignificant levels. Staff therefore modeled a structure where the spilled pool of aqueous ammonia would be open to the atmosphere through a drain opening (or spaces between the cover and the containment walls) no greater than 452 square inches (equivalent to an approximately 21" x 21" drain hole into a subsurface vault). The results are shown in **Hazardous Materials Management Table 4.**

HAZARDOUS MATERIALS MANAGEMENT Table 4.
Distance to EPA/CalARP and CEC Toxic Endpoints
(source: staff modeling with mitigation)

Distance in Feet to IDLH (300 ppm)	Distance in Feet to AIHA's ERPG-2 (150 ppm)	Distance in Feet to CEC level (75 ppm)	Distance in Feet to Max. Predicted Conc. (56 ppm)
n/a	n/a	n/a	~48

The maximum ammonia concentration modeled under this scenario is 56 ppm at approximately 48 feet from the ammonia tank. This distance is on site. Staff predicts that the IDLH (300 ppm), the ERPG-2 (150 ppm), and the Energy Commission level of significance (75 ppm) would not occur under this scenario. Furthermore, staff estimates that the off-site airborne concentration would be a maximum of 34 ppm and that the spill would not even be noticeable beyond 361 feet because the airborne concentration would drop below the usual human odor threshold (2 ppm). This distance falls within the Eastshore property boundary if a spill was to occur when the wind is from the west (the most prevalent case) but would be off site should a spill occur while the wind is from the east, north, or south. In order to ensure that any release of ammonia from the storage tank or during transfer from the tanker truck will not result in a significant off-site impact, staff is proposing condition **HAZ-4** which would require the project owner to obtain review and approval from the Energy Commission Compliance Project Manager (CPM) before constructing the secondary containment and transfer pad.

Staff's full analysis can be found in **Appendix C**.

Direct Impact and Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the Eastshore project include:

- construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery;

- physical separation of stored chemicals in isolated containment areas separated by a noncombustible partition in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- installation of both an automatic sprinkler system and an exhaust system for indoor hazardous materials storage areas;
- construction of a concrete secondary containment area to surround the aqueous ammonia storage tank;
- construction of a bermed containment area to surround the truck unloading area; and
- process protective systems including continuous tank level monitors, temperature and pressure monitors, alarms, check valves, and emergency block valves.

Specific engineering controls would be required in proposed condition **HAZ-4**.

Administrative Controls

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

A worker health and safety program will be prepared by the applicant and include (but is not limited to) the following elements (see the **Worker Safety and Fire Protection** section for specific regulatory requirements):

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

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant will also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (EEC 2006a, Section

8.12.8.2.1). Other administrative controls would be required in proposed conditions **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-3** (development of a safety management plan).

On-site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, as well as other elements. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The Hayward Hazardous Materials Team, stationed at the HFD station No. 6, is located approximately one mile from the project site and designated as the first responder to hazardous materials incidents. For emergency spills, HFD personnel are trained to the first responder level. If the spill is identifiable and can easily be contained and cleaned up, the HFD will use the proper absorbents and contain and clean up the spill. If the spill is large, unidentifiable, or HFD personnel are unable to either contain up or clean the spill, they will contact the Alameda County HazMat Team for containment and cleaning. The City of Hayward has a mutual aid agreement with Alameda County for hazardous material spills. (EEC 2006a, Section 8.12.8.2.2) The HFD response time to a hazardous materials emergency call from Eastshore is approximately three to four minutes (EEC 2006a section 8.8.3.6.3).

Additionally, designated plant personnel will be assigned to a hazardous materials response team and receive first responder training, hazardous materials and technical training, and training in mitigation and control measures (EEC 2006a section 8.12.8.2.2).

Staff has discussed the matter of hazardous materials spill response with the HFD. This matter is addressed in depth in the **Worker Safety and Fire Protection** section of this Preliminary Staff Assessment. Please refer to that section for further information.

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, sulfuric acid, and cleaning chemicals, will be transported to the facility by tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on SR-92 and exit at the Clawiter Road interchange. They would then travel north along Clawiter Road to the plant site. An alternative route from SR-92 would be the Industrial Boulevard interchange. The truck would then travel northwest along Industrial Boulevard, west on Depot Road, and south along Clawiter road to the plant site (EEC 2006a Section 8.10.4.3.2). Staff has analyzed the optional routes and agrees only with the applicant's proposed use of Clawiter Road.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend upon the location of the accident and the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent upon three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and
- accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (I-880 or SR-92). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, The DOT regulations 49 CFR subpart H, §172-700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence. See AFC section 8.10 for additional information on regulations governing the transport of hazardous materials.

To address the issue of tank truck safety, aqueous ammonia will be delivered to the proposed facility in DOT-certified vehicles with design capacities of 6,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The maximum use of aqueous ammonia each year of the operation of the proposed Eastshore project will require about 36 tanker truck deliveries of aqueous ammonia per year (3 deliveries a month x 12 months), each delivering about 6,000 gallons. Each delivery will travel approximately .5- mile from SR-92 along Clawiter Road to the facility.

This would result in about 18 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000.

In addition, staff used a transportation risk assessment model (developed by staff) in order to calculate the risk of an upset from an aqueous ammonia delivery from the freeway to the facility. Results show a risk of 0.2 in 1,000,000 for one trip and a risk of 3.6 in 1,000,000 per year for 36 deliveries. This risk was calculated using accident rates on various types of roads (in this case, urban one-lane) with distances traveled on each type of road computed separately. Although it is an extremely conservative model, the results show that the risk of a transportation accident is insignificant.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

In order to further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposes an additional administrative control in proposed condition **HAZ-6** that would require the use of only one specific route to the site and the use of a flagman at the entrance to the site.

Based on the environmental mobility, toxicity, the quantities at the site and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to both several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of this earthquake. Referring to the sections on **Geologic Resources and Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility will be designed and constructed to the standards of the 2001 California Building Code for

Seismic Zone 4 (EEC 2006 section 2.3.1). 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.

Site Security

The applicant proposes to use hazardous materials identified by the US EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The US EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Council published Security Guidelines for the Electricity Sector in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain hazardous materials conduct vulnerability assessments and implement certain specified security measures. While the rule applies to aqueous ammonia solutions of 20 percent or greater, and this proposed facility plans to utilize 19 percent aqueous ammonia, staff feels that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed conditions of certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for the Eastshore project is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of the consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of consequences of a catastrophic event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Council's (NERC) 2002 guidelines, the U.S. DOE VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of low vulnerability. Staff therefore proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contacts in the event of a security breach. Site access for vendors shall be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.800) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as per 49 CFR Part 1572, Subparts A and B). The compliance project manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

Staff reviewed facilities that use the most likely hazardous material to cause off-site consequences within one mile of the proposed Eastshore project and found that one already exists -- Berkeley Farms, which uses anhydrous ammonia. Another is likely to be built -- the proposed Russell City Energy Center, which would use aqueous ammonia. Staff therefore quantitatively assessed the impacts of a simultaneous release of aqueous ammonia from these two facilities. Staff determined that even in the highly unlikely event of a simultaneous tank failure in both locations, with the resulting loss of their entire contents, the vapor plumes would not mingle (combine) to produce an airborne concentration that would present a significant risk. Staff's full analysis can be found in **Appendix C.** Based upon this and other analyses staff has conducted in the past, including those involving anhydrous ammonia releases, and upon the many factors such as tank design, piping design, engineering controls, secondary containment, and spill/leak detection systems, staff concludes that the chance of a simultaneous release of ammonia from either of the two proposed power plants or from the Berkeley Farms facility, is remote. Staff further concludes that even if a simultaneous release were to occur (and after considering the many factors that impact vapor migration such as temperature, wind direction, wind speed, atmospheric stability, and amount released), the resulting airborne plumes would not mix to cause a significant impact where an insignificant impact existed with one plume alone.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Prior to the issuance of the PSA, there were several written comments received on hazardous materials management issues covered in the AFC from the City of Hayward's fire chief. Staff had met with the fire chief on two separate occasions to discuss the chief's concerns, and the applicant had also met with the chief at least once. No other agency provided comments on hazardous materials management. According to HFD Chief Larry Arfsten, the applicant had provided adequate responses to some but not all of his comments and the applicant has remained in contact to resolve outstanding questions.

While over 1,500 letters had been received from the public on this project, as well as many comments from the public at staff workshops, the majority expressed concerns about public health and air quality; there were also several comments concerning hazardous materials. Most of the written comments on hazardous materials expressed concern about the possibility that the aqueous ammonia storage tanks would rupture and that ammonia fumes would cause injury to the public.

One comment from intervener Paul Haavik addressed the issue of hazardous material spill response time by the HFD. This concern is addressed by staff in the **Worker Safety and Fire Prevention** section of this Final Staff Assessment.

Another comment from the public concerned the piping that would carry ammonia from the tanks to the 14 engine stacks for the selective catalytic reduction (SCR) system. The applicant addressed this issue in a May 4, 2007, filing of supplemental information, (CH2MHill 2007d) in response to a staff data request.

Another comment from intervener Paul Haavik concerned the presence of a private card-reader gasoline station with propane tanks, located just on the other side of the fence at the northwest corner of the site. He was concerned about the safety issue of the aqueous ammonia storage tanks' location close to gasoline and propane tanks, from an accident and sabotage perspective.

Staff is aware of the concerns expressed by the public about a release of hazardous materials, and points out that many controls and procedures will be implemented to prevent a spill of hazardous materials, contain a spill should one occur, and respond quickly to limit the impact of a spill. These controls would consist of both engineering controls and administrative controls and would serve to prevent and contain any accidental release. These controls are outlined in the text of this staff assessment.

Concerning the pipes used to move aqueous ammonia from the storage tank to the engine exhaust stacks for use in SCR, staff reviewed the supplemental information provided by the applicant. The pipe will be made of heavy wall steel and therefore would not be likely to rupture or leak. The piping system would operate at normal atmospheric temperature, low pressure, and low flow so that that a leak would not cause the loss of a significant amount of solution (19 percent ammonia in water). Ammonia sensors will be installed along the pipe route; thus any leak would be detected by either the loss of flow/pressure in the pipe or by an ammonia detector. Since an engine cannot be operated without SCR, that engine and pipe system would be promptly shut down and

the pipe repaired or replaced. Staff concludes that the chance of a spill from the pipe system is low and that the risk to the off-site public, should a spill occur, would be insignificant.

Regarding concerns about the proximity of aqueous ammonia storage tanks to the neighboring underground gasoline and above-ground propane tanks, staff relies upon standards in the Uniform Fire Code (2003 edition). **Table 63.3.1.5.2** provides recommended separation distances between tanks containing various classes of hazardous materials. The recommended distance is 20 feet between flammable gases (propane) and corrosive gases (ammonia). The site plan for the Eastshore project shows that the nearest ammonia tank would be located more than 180 feet from the north fence line. With the additional distance between the fence and the propane tanks, it is clear that this distance more than meets Uniform Fire Code recommendations. It should also be noted that aqueous ammonia is not flammable. Also, located north of the ammonia tanks (~20 feet), is a 5,200-gallon “dirty” water holding tank, followed by a 14,500-gallon clean lube oil storage tank (~12 feet north), followed by two 3,400-gallon used lube oil tanks (~8 feet away). Thus, if a fire or explosion were to occur at the gasoline tanks or at the propane tanks, the aqueous ammonia storage tanks would be protected by both the lube oil storage tanks and the water tank. Staff believes that the ammonia tank strength, the distance involved, and the placement of other structures all reduce the risk of impact to an insignificant level.

Agency and public comments made on the PSA relative to hazardous materials management are generally responded to in the body of the text of this section and summarized below.

AGENCY COMMENTS ON THE PSA

No agency comments were received on the PSA specifically relative to hazardous materials management issues.

PUBLIC COMMENTS ON THE PSA

One public comment was made during the PSA workshop that specifically addressed hazardous materials issues and it was reiterated in writing to the Energy Commission following the PSA workshop. Concern was expressed by the neighboring Fremont Bank about the potential for a hazardous materials leak or spill to adversely impact its employees. Staff has addressed the concern about off-site impacts of hazardous material spills in the FSA section under the headings of **Aqueous Ammonia**, **Direct Impacts and Mitigation,** and **On-site Spill Response**. Staff believes that the combination of engineering controls and spill response will reduce any risk of an off-site impact to an insignificant level.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the Eastshore project would be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

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

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

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

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario, and therefore proposes a condition (**HAZ-3**) requiring the development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications, that the secondary containment structure be subsurface or covered, and that ammonia sensors be placed around the tank and transfer pad. The transportation of hazardous materials is addressed in **HAZ-5** and **-6** and includes a requirement that a flag person be positioned on Clawiter Road when an aqueous ammonia tanker truck turns left from Clawiter into the site. Site security during both the construction and operations phases is addressed in **HAZ-7** and **HAZ-8.**

PROPOSED CONDITIONS OF CERTIFICATION

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

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

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) prepared pursuant to the California Accidental Release Program (CalARP) to the Hazardous Materials Division of the Hayward Fire Department and the CPM for review. After receiving comments from the Hazardous Materials Division of the Hayward Fire Department and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan and RMP shall then be provided to the Hazardous Materials Division of the Hayward Fire Department for information and to the CPM for approval.

Verification: At least thirty (30) days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval. At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least thirty (30) days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage tank shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank and the tanker truck transfer pad shall include a subsurface or covered secondary containment basin capable of holding 125 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The tank and transfer pad shall also be equipped with ammonia sensors. The final design drawings and specifications for the ammonia storage tank, secondary containment structure, and the number, location, and specifications of the ammonia sensors shall be submitted to the CPM.

Verification: At least thirty (30) days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank, the secondary containment structure, and the number, location, and specifications of ammonia sensors to the CPM for review and approval.

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

Verification: At least thirty (30) days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM. Trucks will travel on SR-92 and exit at the Clawiter Road interchange and then travel north along Clawiter Road to the plant site. When aqueous ammonia is transported to the power plant, the project owner shall provide a flagman on Clawiter Road to stop traffic and assist the tanker truck in making the left turn into the power plant site. The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-7 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;
2. Security guards;
3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. Evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-8 The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for

review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not .be less than that described below (as per NERC 2002).

The operation security plan shall include the following:

1. permanent full perimeter fence or wall, at least 8 feet high;

2. main entrance security gate, either hand operated or motorized;

3. evacuation procedures;

4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

6. (A) a statement (refer to sample, **Attachment A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal laws regarding security and privacy;

   (B) a statement(s) (refer to sample, **Attachment B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

7. site access controls for employees, contractors, vendors, and visitors;

8. a statement(s) (refer to sample, **Attachment C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the ammonia storage tank; and

10. additional measures to ensure adequate perimeter security consisting of either:

    a. a security guard present 24 hours per day, 7 days per week;

    <u>or</u>

    b. power plant personnel on site 24 hours per day, 7 days per week, and **all** of the following:

        1. the CCTV monitoring system required in number 9., above, shall include cameras able to pan, tilt, and zoom, have low-light capability, are recordable, and are able to view 100 percent of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **and**

        2. perimeter breach detectors **<u>or</u>** on-site motion detectors.

    The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power pant components --e.g., transformers, gas lines, and compressors -- depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with both appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least thirty (30) days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans, and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit Of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for employment at

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for contract work at

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for hazardous materials delivery to

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

REFERENCES

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

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Hazardous Materials
Appendix A

Basis for Staff's Use of 75 PPM Ammonia Exposure Criteria

September 2004

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

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

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

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

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

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), short-term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.

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

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

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

ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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

Hazardous Materials
Appendix B

Hazardous Materials Proposed for Use at the EEC

June 2007

Hazardous Materials Appendix B
Hazardous Materials Proposed for Use at the EECa

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[b]
Aqueous Ammonia 19 % solution	1336-21-6	NO_X Emissions Control	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	20,000 gallons	100 lb
Biocides: Diethylene glycol, monomethy ether (80-85%)	111-77-3	Biocide for diesel fuel	Health: irritation to skin, eyes, respiratory tract;	Up to 1 gallon	n/a
2-Thiocyano Methylthio Benzothiazol (1 to 5%)	21564.17-0	Biocide for diesel fuel	Health: irritation to skin, eyes, respiratory tract	Up to 1 gallon	n/a
Methylene bis-thiocyanate (1-5%)	6317-18-6	Biocide for diesel fuel	Health: irritation to skin, eyes, respiratory tract	Up to 1 gallon	n/a
Cleaning chemicals/ Detergents	None	Periodic cleaning	Health: various Physical: various	Up to 50 gallons	n/a
Corrosion Inhibitor (Potassium 2-ethylhexanoate 10-30%)	3164-85-0	Cooling tower cooling water corrosion inhibitor	Health: irritant to eyes, skin, and respiratory tract Physical: reactive	50 gallons	n/a
1H-Benzotriazole, methyl-	29385-43-1	Cooling tower cooling water corrosion inhibitor	Health: irritant to eyes, skin, and respiratory tract Physical: reactive	50 gallons	n/a
Diesel No. 2	None	Black-start generator fuel	Eye and skin irritation	100 gallons	n/a
Hydraulic oil	n/a		Health: hazardous if ingested Physical: may be flammable/combustible	50 gallons	42 gallons
Lubrication Oil With:0.03 % zinc 0.33% Phosphoro-Dithoic acid, O,O-Di C1-14-AlkylEasters,	7440-66-6 68649-42-3	Lubricate rotating equipment	Health: hazardous if ingested Physical: may be flammable/combustible	18,000 gallons	42 gallons

Zinc Salts 1-5% Poly Butenyl Succinimide	n/a				
Mineral Transformer Insulating Oil	8012-95-1	Transformers/switchyard	Health: hazardous if ingested Physical: may be flammable/combustible	20,000 gallons	42 gallons
Sulfuric Acid (93%)	7664-93-9	In batteries only	Health: strong irritant to all tissues, may cause minor burns to permanent damage Physical: reactive	In batteries only	1,000 lb

a. Source: EEC 2006a Tables 8.12-2, 8.12-3, and CH2MHill 2007a Table HM-1
b. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

Hazardous Materials
Appendix C

Aqueous Ammonia Spill
Off-site Consequence Analysis

February 2007

AQUEOUS AMMONIA SPILL
Off-site Consequence Analysis

1. AQUEOUS AMMONIA STORAGE TANK SPILL AT EASTSHORE

The following assumptions were made in the HARP analysis of potential impacts due to an aqueous ammonia spill from the on-site aqueous ammonia storage tank at Eastshore.

Dispersion Analysis Using HARP

Meteorological data used:	Representative
Area source:	452 sq. inch drain to underground storage tank (1.77 ft x 1.77 ft)
Release height:	4 feet (assumed; this is min height allowed in HARP)
Emission rate:	1.6 g/m^2/sec (derived using QR algorithm), which is equivalent to 3.67 lb/hour ammonia
Urban	
Fine grid:	500 m with 25 m resolution
Distances determined to:	Maximum 2nd maximum 2 ppm (odor threshold)

Results of this analysis are presented in Table 1 and in Figure 1. The maximum ammonia concentration modeled for a tank spill at Eastshore is 56 ppm at approximately 15 m from the ammonia tank. The odor threshold (2 ppm) is estimated to occur approximately 110 m from the ammonia tank which is within the Eastshore property boundary.

2. SIMULTANEOUS AQUEOUS AMMONIA STORAGE TANK SPILL AT EASTSHORE AND RUSSELL CITY

The following assumptions were made in the HARP analysis of potential impacts due to a simultaneous aqueous ammonia spill from the on-site aqueous ammonia storage tanks at Eastshore Energy Center and Russell City Energy Center (RCEC).

Dispersion Analysis Using HARP

Meteorological data used:	Representative
Area source – Eastshore:	452 sq. inch drain to underground storage tank (1.77 ft x 1.77 ft)
Area source – RCEC:	114 sq. inch drain to underground storage tank (0.89 ft x 0.89 ft)
Release height:	4 feet (assumed; this is min height allowed in HARP)
Emission rate:	1.6 g/m^2/sec ammonia for Eastshore (3.67 lb/hour) and 2.8 g/m^2/sec ammonia for RCEC (1.60 lb/hour)
Urban	
Fine grid:	1000 with 25 m resolution; origin set to Eastshore facility
Distances determined to:	Maximum 2nd maximum 2 ppm (odor threshold)

Results of this cumulative analysis are presented in Table 2 and in Figure 2. The ammonia tank at the Russell City facility is located approximately 1000 m east of the Eastshore ammonia tank.

The maximum ammonia concentration modeled for a simultaneous tank spill at Eastshore and RCEC is 56 ppm at approximately 15 m from the ammonia tank at the Eastshore facility. The odor threshold (2 ppm) is estimated to occur approximately 110 m from the ammonia tank within the Eastshore property boundary.

Table 1. Aqueous Ammonia Storage Tank Spill From Eastshore Energy Center Only.				
ALGORITHM				
QR =	(0.0035)(u^0.78)(MW^(2/3))(A)(VP)			
		(T)		
INPUT				
Wind speed (u)	1.5	m/sec		
Stability class	F			
Terrain	Urban			
Molecular weight (MW)	17	g/g-mole		
Vapor pressure (VP)	190	mm Hg		
Temperature	99	°F		
Temperature (T1)	37	°C		
VARIABLES				
Area of drain in feet	3.14	ft^2		
Side length of drain	1.77	ft		
Area of drain in meters	0.29	m^2		
Side length of drain	0.54	m		
EMISSIONS				
QR	0.06	lb/min		
QR	3.67	lb/hr		
QR	3.21E+04	lb/yr		
QR	0.46	g/sec		
QR	1.6	g/m2/sec		
Concentrations at discrete distances using HARP:				
Distance	Distance	Airborne	Conc.	
(feet)	(meters)	(µg/m3)	(ppm)	
48	15	3.88E+04	56	Maximum concentration
69	21	2.38E+04	34	2nd max concentration
361	110	1.38E+03	2	
Aqueous ammonia vapor pressure obtained from EPA 1999; represents 19% aqueous ammonia, wind speed of 1.5 m/sec				
EPA 1999. "Risk Management Program Guidance for Offsite Consequence Analysis." Office of Solid Waste and				
Emergency Response. April. www.epa.gov/ceppo/				

Table 2. Aqueous Ammonia Storage Tank Spill From Eastshore Energy Center and Russell City Energy Center.				
ALGORITHM				
QR =	(0.0035)(u^0.78)(MW^(2/3))(A)(VP)			
		(T)		
INPUT	**EASTSHORE**	**RCEC**		
Wind speed (u)	1.5	1.5	m/sec	
Stability class	F	F		
Terrain	Urban	Urban		
Molecular weight (MW)	17	17	g/g-mole	
Vapor pressure (VP)	190	332	mm Hg	
Temperature	99	99	°F	
Temperature (T1)	37	37	°C	
VARIABLES	**EASTSHORE**	**RCEC**		
Area of drain in feet	3.14	0.79	ft^2	
Side length of drain	1.77	0.89	ft	
Area of drain in meters	0.29	0.07	m^2	
Side length of drain	0.54	0.27	m	
EMISSIONS				
	EASTSHORE	**RCEC**		
QR	0.06	0.03	lb/min	
QR	3.67	1.60	lb/hr	
QR	3.21E+04	1.40E+04	lb/yr	
QR	0.46	0.20	g/sec	
QR	1.6	2.8	g/m2/sec	
EASTSHORE & RCEC				
Concentrations at discrete distances using HARP:				
Distance	Distance	Airborne	Conc.	
(feet)	(meters)	(µg/m3)	(ppm)	
48	15	3.88E+04	56	
69	21	2.38E+04	34	Maximum concentration
362	110	1.38E+03	2	2nd max concentration
Aqueous ammonia vapor pressure obtained from EPA 1999;				
represents 19% aqueous ammonia for Eastshore, 29% aqueous ammonia for RCEC, wind speed of 1.5 m/sec				
EPA 1999. "Risk Management Program Guidance for Offsite Consequence Analysis." Office of Solid Waste and				
Emergency Response. April. www.epa.gov/ceppo/				

Figure 1. Eastshore only: Ammonia contours.

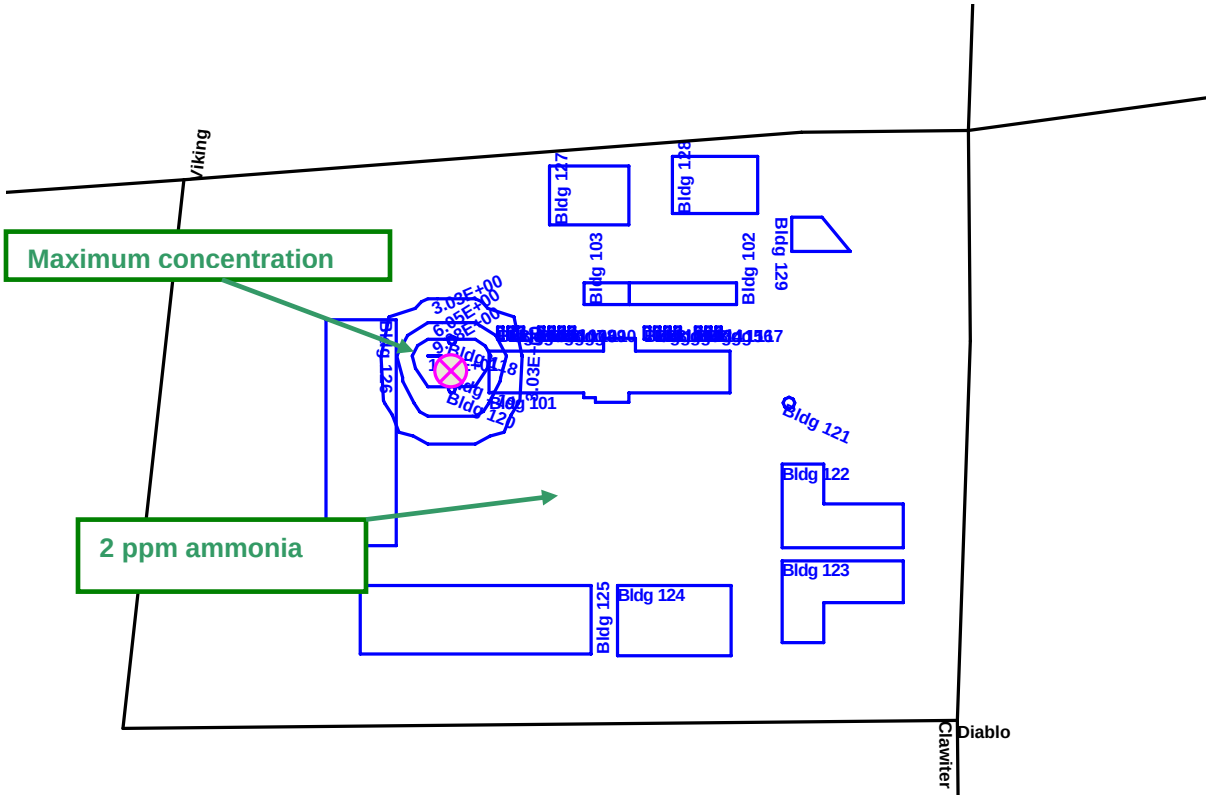
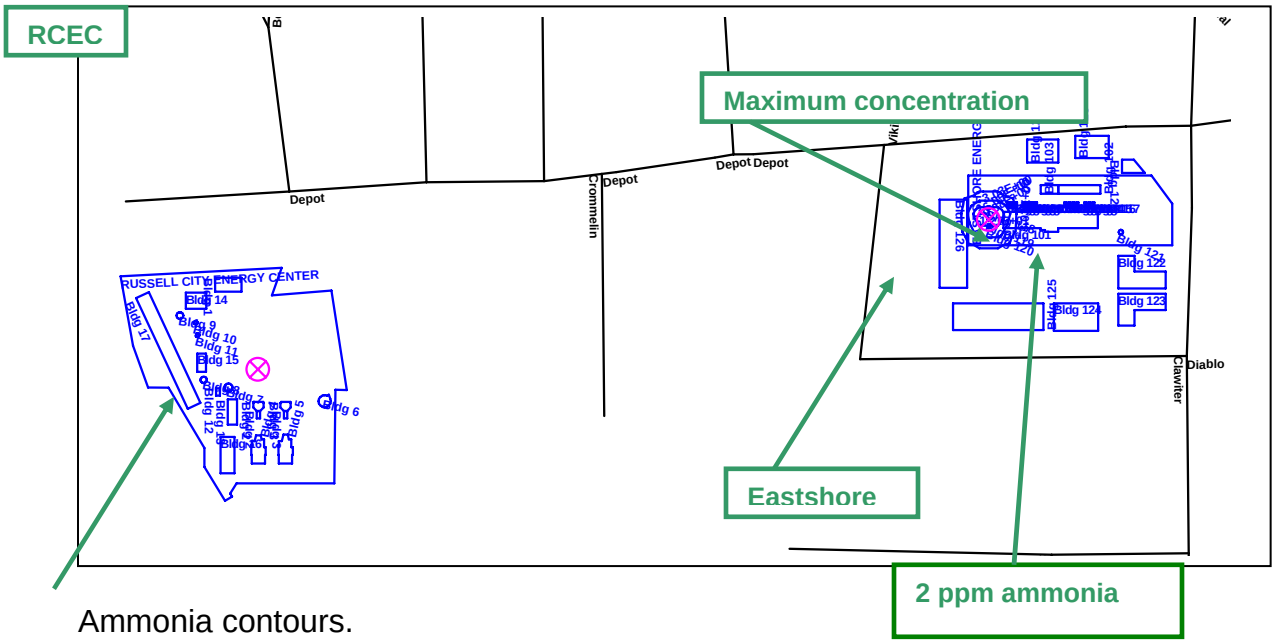


Figure 2. Eastshore & RCEC: Ammonia contours.



Ammonia contours.

LAND USE

Testimony of Shaelyn Strattan and James Adams

SUMMARY OF CONCLUSIONS

- Siting of the Eastshore Energy Center (Eastshore) facility at the proposed location within the Hayward Executive Airport's Airport Approach Zoning Plan (AAZP) is inconsistent with the purpose expressed in Hayward Municipal Code §10-6.00. It is also inconsistent with the Alameda County Airport Land Use Policy Plan (ALUPP) to promote land uses compatible with the airport operations and the safe, efficient use of an airport's airspace.
- The Eastshore project could be a hazard to aircraft (small planes and helicopters) flying over the site at less than 1,000 feet above ground level (AGL) which would be more objectionable than other uses within the Industrial District. Therefore, siting of the project at the proposed location is inconsistent with Hayward Municipal Code §10-1.140.
- The Alameda County Airport Land Use Commission adopted a resolution that recommended that the Eastshore project be located at an alternate site outside the Airport Influence Area for the Hayward Executive Airport.
- The project would interfere with and restrict existing and future operations of the Hayward Executive Airport. This is a significant adverse direct impact for land use.
- The cumulative effect of the Eastshore and nearby Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. Potential mitigation such as pilots seeing and avoiding both power plants is impractical and in some cases unattainable. The FAA notes that the potential for constraints to airport operations create a tangible impact on the future use of the Hayward Executive Airport if the facility is approved at the proposed site. Energy Commission staff concludes that the project's incremental effect, in conjunction with the operation of the RCEC project, is cumulatively considerable.
- Power plant operation, as proposed in this Application for Certification (AFC), is consistent with the primary use classification of "manufacturing" in the Industrial Zone, but, due to certain operational elements, would normally require a conditional use permit (CUP) to be sited at the proposed location. However, the project is inconsistent (not in harmony) with various city of Hayward regulations and policies, including Municipal Code §§10-1.140, 10-1.1620, and 10-6. Upon consideration of the findings required to justify approval of a CUP, Energy Commission staff has concluded that all the necessary findings cannot be made. Approval of the Eastshore project without meeting the requirements for a CUP would be inconsistent with the Municipal Code §10-1.1620 (b)(1)(a) and §10-1.3225.
- The Eastshore project would not physically disrupt or divide an established community or conflict with any applicable habitat conservation plan or natural community conservation plan; result in any impacts to existing agricultural operations or future use; convert farmland to non-agricultural use; or conflict with existing agricultural zoning or Williamson Act contracts.

- The proposed project is consistent with the Hayward Area Shoreline Plan and is not subject to the San Francisco Bay Plan or BCDC jurisdiction. There is no other regulatory Habitat or Natural Community Conservation Plan that is specifically applicable to this project.
- The proposed project is consistent with the applicable 2002 General Plan policies and strategies and the project's proposed location is zoned Industrial, which is consistent with the Industrial Corridor General Plan land use designation. Energy Commission staff is proposing Condition of Certification **LAND-1** to ensure the project is constructed and operated in accordance with the city's minimum Industrial Zoning District standards, to the extent feasible.

INTRODUCTION

The land use analysis of the Eastshore Energy Center AFC focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing or reasonably foreseeable land uses. In addition, a power plant and its related facilities generally have the potential to create impacts in the areas of air quality, noise, dust, public health, traffic and transportation, and visual resources. These individual resource areas are discussed in detail in separate sections of this document.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following table contains all land use LORS applicable to the proposed project.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	None
State	
State Aeronautics Act (Public Utilities Code, Section 21001 et seq.)	This Act provides gives the California Department of Transportation (Caltrans) and local governments the authority to protect the airspace in California; establishes Airport Land Use Commission (ALUC) authority; and identifies the California Airport Land Use Planning Handbook as the primary reference for guidance in the development of ALUC policies and the Airport Land Use Policy/Compatibility Plan development.
Local	
Alameda County Alameda County Airport Land Use Policy Plan (ALUPP)	An Airport Land Use Compatibility/Policy Plan (ALUCP/ALUPP) provides for the orderly growth of an airport and the area surrounding it, excluding existing land uses. Its primary function is to protect the public's health, safety, and welfare by promoting orderly expansion of airports and adoption of land use measures by local public agencies that minimize exposure to excessive noise and safety hazards near airports. The Alameda County ALUPP works in concert with the Hayward General Plan and Zoning Codes, and the Hayward Executive Airport 2002 Master Plan.

City of Hayward General Plan (revised 2002)	The Hayward General Plan contains seven elements and is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within city of Hayward jurisdiction. The Land Use Element of the Hayward General Plan identifies the goals and policies necessary to maintain and enhance neighborhoods, commercial and industrial areas, and surrounding open space. The Economic Development Element identifies the current economic conditions, constraints, and opportunities in the city of Hayward and, in conjunction with Land Use, Circulation, and Housing Elements, provides guidance when considering specific projects and analysis of long-term impacts. Hayward Executive Airport development and operations are discussed in the Airport Master Plan (see below).
Hayward Executive Airport Master Plan (revised 2002)	This plan identifies the current operational status for the Hayward Executive Airport, including descriptions of airport airspace, flight procedures, and current aviation uses. It also includes projections of future use and proposes development plans to accommodate that increased use through the 20-year planning period for this Master Plan.
Municipal Code §§10-1 *et seq*	The city of Hayward Municipal Code, Chapter 10 contains ordinances that deal with planning, zoning, and subdivision standards, requirements, and restrictions. Article 1 of this chapter, also known as the Hayward Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Hayward General Plan, pursuant to the mandated provisions of State Planning and Zoning Law, California Environmental Quality Act (CEQA), and other applicable state and local requirements [HMC(a)]. The following sections are specifically applicable to the proposed project: • §10-1.135 Exceptions (*to General Provisions of the Zoning Code*) • §10-1.140 Exclusionary Zoning Ordinance • §§10-1.1600 *et seq* - Industrial District (I); identifies permitted uses, standards, and restrictions applicable to development in those areas zoned Industrial. • §10-1.3200 Conditional Use Permits, identifies the procedures for reviewing and conditioning projects requiring a conditional use permit before they can be approved and occupied, or before business can be conducted.
Municipal Code §10-6 - Airport Approach Zoning Regulations	This code section (per Hayward City Council Resolution #64-038; 9/15/64) is intended to prevent the creation or establishment of airport hazards[1], thereby protecting the lives and property of the users of the Hayward Executive Airport and of the occupants of the land in its vicinity, and prevent destruction or impairment of the utility of the airport and the public investment therein.

[1] The Hayward Municipal Code §10-6.12 defines an "airport hazard" as any structure or tree or use of land which obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to such landing or taking off of aircraft.

SETTING

The proposed project site is situated within the Hayward city limits and jurisdiction, in the East Bay subregion of the San Francisco Bay Area (see the **Project Description** section of this document for additional information). Land Use LORS applicable to the project are contained in the city of Hayward's General Plan (2002) and Municipal Code, and the 1986 Alameda County Airport Land Use Policy Plan (ALUPP).

The project would be located within the city of Hayward's Industrial Corridor and would be bounded on the north by the Union Pacific Rail Corridor, several warehouses, and a card-reader gasoline station with accompanying propane tanks. The Berkeley Farms processing plant is located to the east of the site; a commercial business park and Herning Investments (industrial trucking and storage) to the south; and Depot Industrial Properties (industrial warehousing) to the west. The project site is also located approximately one mile south of the Hayward Executive Airport and is within the airport's airspace and the Airport Influence Area (General Referral Area), as identified in the ALUPP.

GENERAL PLAN LAND USE DESIGNATIONS AND ZONING WITHIN THE ONE-MILE RADIUS OF THE PROJECT STUDY AREA

Land Use Tables 2 and **3** describe and **Land Use Figures 1 and 2** show the general plan and zoning designations within the one-mile radius of the proposed project site.

LAND USE Table 2
General Plan Land Use Designations within the One-Mile Radius Project Study Area

Jurisdiction	General Plan Land Use Designation*
City of Hayward	North: Industrial Corridor, Residential (low and medium density residential and mobile home park to the northwest); Retail and Office Commercial; Public and Quasi-Public South: Industrial Corridor, Transportation Corridor (State Route [SR] 92 Freeway) East: Industrial Corridor; Residential (low, limited medium, and high density residential); Public and Quasi-Public; Retail and Office Commercial; isolated strip of Park and Recreation to the southeast. West: Industrial Corridor; Open Space (Baylands)

**Source: Hayward 2007a*

LAND USE Table 3
Zoning Designations within the One-Mile Radius Project Study Area

Jurisdiction	Zoning Designation*
City of Hayward	North: Industrial (I); Planned Development (PD; northwest); Single Family Residential/Minimum Lot Size – 5,000 ft^2 (RS); Medium Density Residential/Minimum Lot Area – 2,5000 ft^2 (RM); Mobile Home Park; Central Business South: Industrial East: Single Family Residential/Minimum Lot Size – 5,000 ft^2 (RS) Medium Density Residential/Minimum Lot Area – 2,500 ft^2 (RM) High Density Residential/Minimum Lot Area – 1,250 ft^2 (RH) Neighborhood Commercial (CN) Industrial; Light Manufacturing (LM); Business Park (BP) Planned Development West: Industrial; Flood Plain (FP)

**Source: Hayward 2007b.*

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and acquired from other sources to determine consistency of the Eastshore project with applicable state and local laws, ordinances, regulations, and standards and the potential for the proposed project to have significant adverse land use-related impacts. Staff has also assessed the potential for mitigation proposed by the applicant and conditions developed by staff to reduce any potential impacts to a less than significant level, as well as the feasibility and enforceability of those proposed mitigation and recommended conditions of approval.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

State/CEQA

Significance criteria used in this document are based on the CEQA Guidelines and thresholds adopted by other responsible agencies. Land use impacts may be considered significant if the project would:

- Conversion of Farmland
  - Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
  - Conflict with existing zoning for agricultural use or a Williamson Act contract.
  - Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physically disrupt or divide an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, community or specific plan, local coastal program, airport land use compatibility plan, or zoning ordinance.
- Have individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if it creates unmitigated noise, dust, or a public health or safety hazard or nuisance; results in adverse traffic or visual impacts; or precludes, interferes with, or unduly restricts existing or future uses. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts, recommended mitigation, and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

There are no properties within one mile of the proposed project site, or within 0.25 miles of the pipeline and utility easements, or transmission corridor, that are identified as Prime or Unique Farmland, or Farmland of Statewide Importance (Farmland); zoned Agricultural or designated for agricultural use under the city of Hayward's General Plan; subject to the restrictions of a Williamson Act contract; or used for commercial agricultural purposes. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. Therefore, the proposed project would not result in the conversion of Farmland to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Division of an Existing Community

The proposed Eastshore Energy Center project is located in the eastern portion of the city of Hayward's Industrial Corridor, an established industrial area along Clawiter Road, north of State Route 92. The power plant would be located entirely on private property, on an existing parcel, and generally within the footprint of an existing manufacturing building. Access to the site and the adjacent off-site construction parking and laydown area would be at existing encroachments to Clawiter Road and no existing roadways or pathways would be blocked or removed from service. The new switchyard would be constructed entirely within the primary site boundaries and transmission lines would extend along the east side of Clawiter Road, along the existing Pacific Gas & Electric (PG&E) rights-of-way and transmission corridor (EEC 2006, §5). Water and wastewater connections are already installed on-site and the natural gas supply pipeline for the facility would be installed via an underground bore originating at the project site, extending under Clawiter Road and the existing Union Pacific Railroad (UPRR) right-of-way, then connecting to PG&E's existing gas pipeline 153, approximately 200 feet to the northeast (EEC 2006, §2.1.1). Neither the transmission nor utility lines would present a

new physical barrier within the community. Activities associated with widening the existing utility rights-of-way and installation of the transmission pole upgrades would not block existing transportation corridors and would only result in limited road delays. Arrival and departure of plant employees and delivery of materials and supplies would occur along existing roadways at times that would not significantly contribute to existing traffic congestion during the commute hours (see **TRANS-1** condition of certification). Therefore, implementation of the proposed project would have a less than significant impact on community transportation or interaction and would not divide the community.

Conflict with any Applicable Habitat or Natural Community Conservation Plan

There are several sensitive natural resource areas in the general vicinity of the project site, including Cogswell Marsh, the Hayward Area Recreation District (HARD) Marsh, the Hayward Regional Shoreline, and the San Francisco Bay (see the **Biological Resources** section of this document for more information). Both the San Francisco Bay and Hayward Regional Shoreline have plans designed to guide development and protect the natural, cultural, and scenic resources of the area.

As noted in AFC §8.4.2.3.2, the San Francisco Bay Plan, administered by the San Francisco Bay Conservation and Development Commission (BCDC), provides an enforceable regulatory framework that guides the protection and use of the San Francisco Bay and its shoreline. The proposed project site is located approximately 0.5 miles east of the nearest bayshore encroachment and more than one mile east of the San Francisco Bay shoreline. It is outside of the BCDC jurisdictional boundaries.

The Hayward Area Shoreline Plan was developed by the Hayward Area Shoreline Planning Agency (HASPA), a joint cooperative planning advisory agency with representatives from the city of Hayward, East Bay Regional Parks District, HARD, Hayward Unified School District, and the San Lorenzo Unified School District. HASPA coordinates long-range planning for the shoreline area, which includes all shoreline properties located between the Union Pacific Railroad tracks and the bayshore in the city of Hayward. Although the Shoreline Plan generally does not apply to properties within the Industrial Corridor, the proposed project is consistent with the key HASPA objectives, which support resource protection and best management practices for land management efforts; encourage industrial development and traffic circulation improvements; and promote industrial in-fill development in areas designated for industrial and public utilities.

Therefore, the proposed project is consistent with the Hayward Area Shoreline Plan and is not subject to the San Francisco Bay Plan or BCDC jurisdiction. There is no regulatory Habitat or Natural Community Conservation Plan that is specifically applicable to this project.

Conflict with any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any Amendments), project design and operational components, and siting to determine if elements of the proposed project would conflict with any applicable land

use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. This includes all applicable federal, state, and local laws, ordinances, regulations, and standards, including those adopted by Alameda County and the city of Hayward. From a CEQA perspective, the analysis places particular emphasis on any environmental effect that may be avoided or mitigated by conformity with the applicable LORS. A summary of the project's compliance with applicable LORS is contained in **Land Use Table 4** at the end of this subsection.

State Aeronautics Act

The State Aeronautics Act (California Public Utilities Code §§21001 *et seq*) gives the California Department of Transportation (Caltrans) and local governments the authority to protect the airspace in California. It provides for the right of flight over private property, unless conducted in a dangerous manner or at altitudes below those prescribed by federal authority [Pub. Util. Code(a), §21403(a)]; and prohibits use of the airspace above a property in a manner that would interfere with the right of flight, including established approaches to a runway [Pub. Util. Code(a), §21402].

This statute changed the role of the Handbook from a useful reference document to one that must be used as guidance in the development of ALUC policies and the Alameda County Airport Land Use Policy Plan (ALUPP). It also requires that: "An airport land use commission that formulates, adopts or amends a comprehensive airport land use plan shall be guided by … the Airport Land Use Planning Handbook published by the Division of Aeronautics of the Department of Transportation" (Pub. Util. Code §21674.7). Consistency with the State Aeronautics Act, as incorporated in the ALUPP, is discussed below.

CEQA also requires a lead agency to utilize the California Airport Land Use Planning Handbook when preparing an Environmental Impact Report (EIR) for a project within the boundaries of a comprehensive airport land use plan or, if a comprehensive airport land use plan has not been adopted for a project within two nautical miles of a public airport or public use airport. [Cal. Code Regs., tit. 14, section 15154 (a)].

Alameda County Airport Land Use Policy Plan (ALUPP)

The Alameda County ALUPP was adopted on July 16, 1986 by the Alameda County Airport Land Use Commission (ALUC) and provides a framework for reviewing significant proposals for future development in the vicinity of public and public use airports within Alameda County. The ALUC's mandate is to protect the public's health, safety, and welfare by promoting orderly expansion of airports and adoption of land use measures by local public agencies that minimize exposure to excessive noise and safety hazards near airports (ACALUC 1986, p.1). ALUC safety compatibility policies address the protection of people and property on the ground near airports and protection of airport airspace from obstructions and other hazards to flight. (Caltrans 2002; Summary, p.6.) Hayward Executive Airport (Hayward Air Terminal when the current ALUPP was adopted) is within ALUC jurisdiction. The 1984 Hayward Executive Airport Master Plan Study (HWD 1984; COH 2007k) and city of Hayward Ordinance 64-038, Airport Approach Zoning Plan, which were both in force at the time the 1986 ALUPP was adopted, were determined to be consistent with the Plan, as was the

current Hayward Executive Airport 2002 Master Plan (ACALUC 2007). The ALUPP hazard prevention policy elements are incorporated into and implemented by the city of Hayward's Airport Approach Zoning Regulations. The Alameda County Airport Land Use Commission adopted a resolution that recommended that the Eastshore project be located at an alternate site outside the Airport Influence Area for the Hayward Executive Airport.

The proposed project site is located within the ALUPP General Referral Area/Hazard Prevention Zone for Hayward Executive Airport (see **Land Use Figure 3)**, which prohibits uses that could present a hazard to air navigation (ACALUC 1986, p.56). Although thermal plumes are not specifically identified as an aviation safety hazard[2] in the ALUPP, overflight of the high velocity thermal plumes that would be generated by the Eastshore project's 14 stacks at pattern altitude (550 to 650 feet AGL) have the potential, during certain weather conditions, to adversely impact a pilot's ability to maneuver safely and unimpeded within this zone [also known as the Airport Influence Area (AIA)] and would, therefore, qualify as a hazard (see the **Traffic and Transportation** section of this Final Staff Assessment (FSA).

As noted in the **Land Use** section of the Eastshore Preliminary Staff Assessment (PSA), the FAA issued a special security Temporary Flight Restriction (TFR) following 9/11 in the interest of national security and consistent with the requirements of 14 CFR 99.7[3]. In a Notice to Airman (NOTAM) 4/0811, pilots are strongly advised to avoid, to the extent practicable, the airspace above or in proximity to power plants and other similar uses [FAA(d)]. Pilots are also advised not to circle or loiter in the vicinity of or over these facilities. However, subsequent to the publication of the Eastshore PSA, staff has been advised by the FAA that the TFR/NOTAM does not apply to aircraft landing and departing from an airport or those involved in touch-and-go and low approach maneuvers. Aircraft in a traffic pattern are not considered to be loitering (FAA 2007). Therefore, the TFR/NOTAM would not apply to the Eastshore project.

Due to the proximity of the Eastshore facility to the downwind departure for Runway 28L and the Hayward airport traffic pattern, placing additional limitations (FAA recommends that pilots avoid direct overflight of plumes at less than 1,000 feet above ground [FAA 2006]) within an already complex and congested airspace would be inconsistent with the intent of the ALUPP to promote land uses compatible with airport operations and the safe, efficient use of an airport's airspace (see the **Traffic and Transportation** section for a detailed discussion).

City of Hayward General Plan

All properties that would make up the proposed Eastshore project site, including transmission corridors, utility and access easements, and construction parking and laydown areas, would be within the city of Hayward jurisdictional boundaries and would, therefore, be subject to the current city of Hayward LORS, including the Hayward

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[2] "Hazard" is defined by the FAA as "[A]ny real or potential condition that can result in injury, illness, or death to people; damage to or loss of a system (hardware or software), equipment, or property; and/or damage to the operating environment" [FAA(b), p.19].

[3] 14 CFR §99.7 applies to aircraft operating in a "Defense Area". This does not simply apply to military installations or operation areas, but to any airspace of the U.S. or its territories where control of aircraft is required for reasons of national security.

General Plan (2002), Municipal (Zoning) Code, and permitting requirements, except for the Energy Commission's exclusive jurisdiction.

The Hayward General Plan contains seven elements and is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within the city of Hayward. The Land Use Element of the Hayward General Plan, added as part of the July 2002 General Plan update, identifies the goals and policies necessary to maintain and enhance neighborhoods, commercial and industrial areas, and surrounding open space. The Economic Development Element of the 2002 General Plan identifies the current economic conditions, constraints, and opportunities in the city of Hayward and, in conjunction with Land Use, Circulation, and Housing Elements, provides guidance when considering specific projects and analysis of long-term impacts. The Hayward General Plan does not address the Hayward Executive Airport. Discussion of the airport's current operational status, including descriptions of airport airspace, flight procedures, and current aviation uses, is discussed in the Hayward Executive Airport 2002 Master Plan. This plan also includes projections of future use and proposes development plans to accommodate that increased use through the 20-year planning period for this Master Plan. (See ***Hayward Executive Airport Master Plan*** below.)

The proposed project site is designated as part of the Industrial Corridor in the 2002 Hayward General Plan. Plans and goals for the Industrial Corridor are specifically discussed in the Focus Area section of the Land Use Element, with primary emphasis on future changes that have yet to be codified or implemented. These include the potential for multiple zoning districts within the Industrial Corridor; integration or separation of land uses, based on the presence of hazardous materials or intensity of use; the need for additional parking, compared to the current limited demands at warehouse facilities; and an increase in minimum parcel size to accommodate the larger scale manufacturing or research and development operations (COH 2002, Land Use Element, pp.12-21).

The proposed project does not increase the need for additional parking or require an increase in the minimum parcel size to accommodate the project's design or operation. It does, however, use hazardous materials during normal operation. Under the General Plan discussion of *The Transformation of the Industrial Corridor*, Integration vs Segregation of Land Uses (COH 2002, Land Use Element, pp. 2-13, 2-14), it is suggested that businesses using hazardous materials, including high-tech businesses such as computer chip manufacturers, be grouped together, at a distance from adjacent residential areas to facilitate emergency response and the protection of the public health, safety, and welfare. No minimum separation distance is specified or recommended. To date, no area has been designated for businesses using hazardous materials within the Industrial Corridor. However, the proposed Eastshore project site is located directly across from the Berkeley Farms processing facility, which also uses hazardous materials in its operation (see **Hazardous Materials** section of this FSA, as well as Section 10-1.3200 discussion and Discussion #1 below). The safety risks associated with the use of hazardous materials within the Industrial Corridor are currently evaluated by the city of Hayward on a project-by-project basis.

The Land Use Policies and Strategies section of the Land Use Element includes the following goals, policies, and implementation measures that relate to the proposed project (COH 2002, Land Use Element):

1. Industrial Corridor (Business and Technology Corridor)[4]

   Policy 7 of this section strives to promote the transition of the Industrial Corridor from a manufacturing-based economy to an information-based economy in the industrial areas. To effect this transition, Strategy 7(1) recommends the city consider adoption of multiple zoning districts within the Industrial Corridor that would provide for a concentration of similar types of uses, such as manufacturing, warehouse/ distribution, or research and development/offices. In addition, Strategy 7(2) recommends the city identify specific sites or opportunity areas for highly desirable uses that enhance the tax base.

   Zoning district designations have been adopted to accommodate the recommended division of the Industrial Corridor and are identified as Business Park District (BP) [HMC(a), §10-1.1700] and Light Manufacturing; Planning/Research and Development District (LM) [HMC(a), §10-1.1800]. The BP District is intended to provide for the establishment of high quality business office parks in a campus environment, at key locations within the Industrial Corridor. The LM District would accommodate limited manufacturing and other light industrial uses within the Industrial Corridor that are compatible with business parks and adjacent residential areas. To date, identification or development of these locations or districts in the vicinity of the Eastshore project has not been proposed or adopted, and Energy Commission staff knows of no formal action that has been taken to exclude the areas containing and surrounding the Eastshore location from uses similar to the proposed project. The proposed project site has a General Plan land use designation of Industrial Corridor and the proposed use is consistent with other uses currently permitted within that land use designation. The proposed project does use hazardous materials (e.g., aqueous ammonia) during normal operation, but is sited adjacent to the existing Berkeley Farms facility, which stores and uses anhydrous ammonia, a more potent and hazardous ammonia product. Surrounding properties are used primarily for manufacturing, warehousing, and small wholesale, retail, and construction businesses. Only scattered residences or other potentially sensitive receptors are within one-third mile of the proposed facility (see **Land Use Compatibility** discussion below).

   Although the proposed project is not an information-based industry and does not directly promote the transition of the Industrial Corridor from a manufacturing base to one based more on information technologies, it would not hinder the transition of other properties in the industrial area. Therefore, the proposed project does not conflict with the goals expressed in Policy 7 or obstruct the implementation of Strategy 7(1) and is consistent with this portion of the Hayward General Plan.

[4] References to the “Industrial Corridor” are used interchangeably with the “Business and Technology Corridor” throughout the 2002 Hayward General Plan. However, there is no evidence that this identification has been formally codified.

The Economic Development Policies and Strategies section of the Economic Development Element includes the following goals, policies, and implementation measures that relate to the proposed project (Hayward 2002, Economic Development Element):

2. Land and Infrastructure

General Plan Policy 2 of the Economic Development element encourages the creation of a sound local economy that attracts investment, increases the tax base, creates employment opportunities for residents, and generates public revenues. Several strategies are suggested to accomplish this, including the following:

- Strategy 2(1) encourages efforts to revitalize declining commercial and industrial areas and obsolete facilities through rezoning, redevelopment, rehabilitation, and other available means. The proposed project would redevelop an existing industrial lot by replacing a deteriorating vacant warehouse with a state-of-the-art energy facility that would provide tax revenues to the city and employment opportunities for its residents. The project is, therefore, consistent with Strategy 2(1).
- Strategy 2(3) directs the city to ensure there is adequate infrastructure (transportation and communication networks, water, sewer, wastewater, and stormdrain system) to support existing and new development. The proposed project design, Energy Commission certification requirements, and condition of certification **LAND-1** ensure that there would be adequate infrastructure in place prior to the start of plant operations. The project would, therefore, be consistent with Strategy 2(3).
- Strategy 2(5) recommends limits on uses that would erode the integrity of the Business and Technology Corridor and Strategy 2(7) directs the city to promote and protect the appearance of the Business and Technology Corridor to encourage quality development. To date, the boundaries and development standards of the Business and Technology Corridor, as an area separate and distinct from the Industrial Corridor, have not been identified. However, on March 13, 2007, the Hayward City Council voted unanimously that the Eastshore Energy Center project would not be “in harmony with the applicable General Plan policies that seek to ‘promote and protect the appearance of the Business and Technology Corridor to encourage quality development’ in that the 6.2-acre site proposed for the power plant is near the eastern edge of the industrial area of the City, abutting residential areas…”.

  The proposed project site has a General Plan land use designation of Industrial Corridor, which, by definition, is primarily devoted to industrial uses. It would be sited in the eastern section of the Industrial Corridor and is approximately one-third to one-half mile away from most residential development. As noted in Discussion #1 above, the proposed use is consistent with other uses currently permitted within that land use designation and, although the project would use hazardous materials during normal operation, it would be sited adjacent to an existing facility with similar hazardous materials usage and located even closer to residential areas. Additionally, the project proposes, and would be required by **Visual Resources** conditions of certification (See **Visual Resources** section of this document), to landscape the facility along roadways and areas visible to

local residents and motorists to reduce the plant's visual impact and increase the visual compatibility with surrounding properties. The City Council Resolution did not cite specifics to support their determination and Energy Commission staff has been unable to identify any project elements that would erode the integrity or appearance of the Industrial Corridor. Therefore, despite the Hayward City Council's findings of inconsistency, Energy Commission staff concludes that the project is consistent with Strategies 2(5) and 2(7).

3. Employment Opportunities

   General Plan Policy 3 of the Economic Development element instructs the city to facilitate the development of employment opportunities for residents.

   - Strategy 3(1) recommends promotion of commercial and industrial development to create and maintain the maximum job opportunities for area residents. The March 13th City Council Resolution (COH 2007a) indicated that the proposed project would not be consistent with this General Plan strategy because such sites (abutting residential areas) …"would be more appropriately developed with emerging and higher technology businesses that tend to cluster and generate higher paying jobs". The City Council also noted that "such uses (*emerging and higher technology businesses*) would have higher numbers of employees than the expected 15-20 employees anticipated for operation of the plant (italics added)." Although this Strategy encourages the development of uses that would generate a high number of jobs, it is directed at the city and does not preclude the use of Industrial Corridor properties by permitted uses with a limited number of employees. It should also be noted that the project site does not abut a residential area, but is situated in the eastern half of an area set aside by the city for industrial purposes. Therefore, although the number of permanent jobs generated by the proposed project is limited, locating it within the Industrial Corridor is not inconsistent with this General Plan Policy or Strategy.

Therefore, despite the Hayward City Council's determination of inconsistency, Energy Commission staff concludes that the project is consistent with the goals and policies of the 2002 city of Hayward General Plan.

Hayward Executive Airport Master Plan (2002)

The current Hayward Executive Airport Master Plan was adopted in April 2002 to identify the operational status of the airport, including descriptions of airport airspace, flight procedures, and current aviation uses; provide projections of future use; and outline development plans to accommodate the projected increased use throughout the 20-year planning period. However, the Master Plan does not discuss land use and its compatibility with airport regulations outside airport property boundaries, except as it might apply to noise abatement procedures, airport access, and future airport expansion.

The Master Plan does include various airport layout and airspace drawings that illustrate airspace boundaries and their proximity to the proposed project. These include the:

- Area Airspace (**Land Use Figure 4**), which illustrates the airspace boundaries and the way in which navigable airspace overlaps for Hayward Executive Airport and all other public use airports within 30 nautical miles of the Hayward airport. The Eastshore site is within the Hayward airport airspace boundaries.
- Safety Zones (**Land Use Figure 5**), which primarily address land use compatibility associated with risks that aircraft accidents pose for people and property on the ground. Additional safety compatibility criteria apply to land use characteristics that can cause an aircraft accident or contribute to its consequences for people on board the aircraft (Caltrans 2002, p.9-53). The Eastshore site is not within any of the safety zones.
- Airport Airspace Drawing (**Land Use Figure 6**), which is a tool for local authorities in determining if proposed development could present a hazard to the airport. The proposed project site is located within the conical surface boundaries, which extends from the surface to 350 feet AGL.

Consistency with this Master Plan is determined primarily by consistency of the project with various airport-related city of Hayward Municipal Code sections, as discussed below. Unlike the General Plan, there are no applicable land-use-related goals, policies, or strategies included in this document.

City of Hayward Municipal Code Chapter 10 – Planning, Zoning, and Subdivisions

Chapter 10 of the Hayward Municipal Code contains ordinances that deal with planning, zoning, and subdivision standards, requirements, and restrictions. Article 1 of this chapter, also known as the Hayward Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Hayward General Plan, pursuant to the mandated provisions of the State Planning and Zoning Law, CEQA, and other applicable state and local requirements [HMC(a)]. While the proposed project is subject to all applicable Hayward Municipal Code requirements, the sections of the Hayward Zoning Ordinance that apply specifically to land use are discussed below. Additional city of Hayward code requirements are addressed in other technical sections of this FSA.

Section 10-1.135 Exceptions

This section of the Hayward Municipal Code exempts the following uses from provisions of the Zoning Ordinance and permits the uses in any district: poles, towers, wires, cables, conduits, vaults, laterals, pipes, mains, valves, or any other similar distributing and transmitting equipment for electric power, provided the installation conforms with applicable Federal Communications Commission (FCC), California Public Utilities Commission (CPUC), and Federal Aviation Administration (FAA) rules and regulations, or any other applicable LORS. Therefore, the Industrial Zoning District height restrictions, setbacks, and minimum design and performance standards do not apply to the project's transmission line and underground pipelines. This exemption does not apply to those project elements related to the generation of electricity, including stacks.

Section 10-1.140 Exclusionary Zoning Ordinance

Hayward Municipal Code §10-1.140 (Exclusionary Zoning Ordinance) states that uses not specifically listed as "Uses Permitted" within a Zoning District are prohibited unless it

can be determined the use is "…not more objectionable or intensive than the uses listed." Power plants are not a permitted use within the Industrial District, but have been determined to be a use similar to a permitted use (manufacturing) and similar to other uses existing within the Industrial District (COH 2001e). However, although Hayward City Council Resolution #01-104 confirmed these similarities, it did not address the project's potential to impair the current operation of the Hayward Executive Airport and the airport's ability to expand operations to accommodate future demands (see Section 10-6 Airport Approach Zoning Regulations Impacts later in this analysis). This is considered by Energy Commission staff to be more objectionable than other uses within the Industrial District that would create less of a detriment to surrounding properties. Therefore, siting of the project at the proposed location is inconsistent with §10-1.140.

Section 10-1.1600 Industrial District (I)

The proposed project site is zoned Industrial (COH 2007c), which is consistent with the Industrial Corridor General Plan Land Use designation. Section §10-1.1600 of the Hayward Municipal Code (HMC) identifies the uses allowed, development standards and restrictions, and minimum design and performance standards for projects within the Industrial Zoning District. The purpose of the Industrial Zoning District, as expressed in HMC §10-1.1605, is to "provide for and encourage the development of industrial uses in areas suitable for same, and to promote a desirable and attractive working environment with a minimum of detriment to surrounding properties."

As noted in Section 10-1.140 above, power plants are not identified as a permitted use in §10-1.1615 [HMC(a)]. However, uses determined to be similar by the Planning Director (or, at the Planning Director's discretion, the Hayward Planning Commission or City Council) are permitted in the Industrial District as primary uses, when not adjacent to a residentially zoned property or properties, specified as an administrative or conditional use, and when conducted completely within an enclosed building(s), except that minor open storage may be permitted as an ancillary use.

On July 10, 2001, the Hayward City Council adopted Resolution #01-104, which established that power plants are a use similar to a permitted use (manufacturing) in the Industrial Zoning district and are similar to other uses existing within the Industrial District (COH 2001e). As expressed in the city of Hayward Planning staff's report to the City Council in 2001 (COH 2001c) and Resolution #01-104, power plant operation fits under the primary use classification of "manufacturing" in the Industrial District, in that the conversion of natural gas by mechanical equipment into electric power constitutes a form of manufacturing.

However, per Hayward Municipal Code §10-1.1620, there are certain permitted uses that are generally consistent with the purpose of a base zoning district, but that may, in certain instances, have the potential to cause conflicts with neighboring land use and zoning. These normally require an administrative or conditional use permit from the city of Hayward Planning Department prior to being allowed within the Industrial District. These uses may also be subject to conditions of project approval that are necessary to reduce or eliminate potential environmental effects or protect the public health, safety and welfare [HMC(a), §10-1.3200). The Eastshore project contains elements that would normally require it to obtain a CUP, except for the Energy Commission's exclusive authority, and therefore requires further evaluation to determine its compatibility within

the Industrial Zoning District (see Section 10-1.3200 Conditional Use Permits (CUP) below).

Hayward Municipal Code §§10-1.1625-1645 show the development standards, restrictions, site reviews, and minimum design and performance standards for land use within the Industrial Zoning District, as defined by the city of Hayward Municipal Code. These are the requirements that the project would have to meet if the city of Hayward was the permitting agency. Additional conditions could also be imposed to mitigate any potential environmental impact or the effect of the project on surrounding properties and the city of Hayward at large. Based on an independent review of the AFC and Hayward Municipal Code, and consideration of the city's conformity letters, Energy Commission staff has determined that the project would not conform with all city of Hayward land use LORS. However, should the Energy Commission certify the project, staff has proposed condition of certification **LAND-1** as a means of verifying that the project would be built in accordance with the city's minimum Industrial Zoning District standards, to the greatest extent feasible. However, even full implementation of **LAND-1** would not resolve all project inconsistencies with §10-1.1600 requirements (see Section 10-1.3200 below).

Section 10-1.3200 Conditional Use Permits (CUP)

Hayward Zoning Code §10-1.1620 requires that projects using Group A hazardous materials in their operations obtain a conditional use permit, approved by the Hayward Planning Commission, before they can be sited within the Industrial Zoning District. Because the Eastshore project would use Group A hazardous materials in its operation, it would be subject to this requirement, except for the Energy Commission's exclusive authority. (See **Hazardous Materials** section of this FSA for additional information regarding the type and use of hazardous materials by this project.) The following findings are required for approval of a conditional use permit, in compliance with Hayward Municipal Code §10-1.3225:

a. The proposed use is desirable for the public convenience or welfare.

b. The proposed use will not impair the character and integrity of the zoning district and surrounding area.

c. The proposed use will not be detrimental to the public health, safety, or general welfare.

d. The proposed use is in harmony with applicable city policies and the intent and purpose of the zoning district involved.

Finding (a) can be met, as follows:

The city of Hayward, like all communities within the State of California, is dependent on adequate electrical power to provide for the needs of its citizens and support a strong local economy. While the electricity generated by the proposed power plant would not be solely dedicated to the immediate surrounding area, it would support the sustainability of the area's power grid, contributing indirectly to public convenience and welfare.

For Finding (b), Hayward City Council Resolution #01-104 confirms that power plants are a use similar to a permitted use (manufacturing) in the Industrial Zoning district and other existing uses (Hayward 2001e). However, in Resolution #07-028(1) (COH 2007c), the city of Hayward expressed concerns regarding the suitability of siting the proposed project at the Clawiter Road location for the following reason: "Introduction of highly visible 70-foot tall venting stacks, which would be seen from residential areas to the east and would be incompatible with the heights of existing facilities in the area."

The visibility of the proposed facility from various key observation points around the area and visual compatibility with surrounding businesses is addressed in the **Visual Resources** section of this FSA. In a letter to the Energy Commission (COH 2007g, p.4), Hayward Planning Manager, David Rizk, expressed the city's belief that the visual and aesthetic impacts of the stacks cannot be mitigated below significance. However, the height of the Eastshore stacks is comparable to other industrial/manufacturing structures within 0.5 mile of the proposed project site, including Gillig Inc. and Berkeley Farms, and the proposed stacks are not as tall as the existing Rohm & Haas stack (180 feet) or the twin stacks of the Russell City Energy Center (145 feet), which the city supports. Based on these comparisons and staff's visual analysis, in addition to the information noted in the Hayward General Plan Discussion 2 above, Energy Commission staff has concluded that placement of the facility at the proposed location would not impair the character and integrity of the zoning district and surrounding area, thereby supporting CUP Finding (b).

For Finding (c), Resolution #07-028(1) (COH 2007c) indicated that "[T]he power plant would be detrimental to the public health, safety, and welfare due to the potential for air quality and hazardous materials impacts related to the use and transport of aqueous ammonia and emission of particulate matter and nitrogen oxides."

Energy Commission staff's analysis of the potential air quality impacts from the proposed facility did not identify any potential impacts that would not be mitigated to a less than significant level with implementation of the proposed conditions of certification (see the **Air Quality** section of this FSA).

Potential impacts related to the use of hazardous materials at the Eastshore facility are discussed in the **Hazardous Materials** section of this FSA, but, with implementation of the proposed conditions of certification, have not been deemed significant. Additionally, the hazardous materials used at the Eastshore facility would be similar to those used by other businesses in the area and would be delivered along the same State Route 92/Clawiter Road hazardous materials route. As noted in General Plan #1 above, the proposed project would use hazardous materials (e.g., aqueous ammonia) during normal operation, but the Berkeley Farms facility, located directly across Clawiter Road from the site, also stores and uses hazardous materials, including anhydrous ammonia, a more potent ammonia product.

Energy Commission staff has concluded that the project would not be detrimental to public health, safety, and welfare due to the potential for air quality and hazardous materials impacts. Energy Commission staff has concluded that Finding (c) can be made.

For Finding (d), Resolution #07-028(1) (COH 2007c) also cited both of the reasons indicated for Findings (b) and (c) above as support for the determination that the proposed Eastshore project would not be in harmony with applicable city policies and the intent and purpose of the zoning district involved. Energy Commission staff concurs with the city's determination, but for different reasons than those cited in their resolution.

The intent of the Industrial Zoning District, as identified in Hayward Zoning Code §10-1.1605, is to provide for and encourage the development of industrial uses in areas suitable for same, and to promote a desirable and attractive working environment with a minimum of detriment to surrounding properties. The proposed project site is zoned Industrial, which is consistent with the site's General Plan designation of Industrial Corridor. It is similar in appearance to surrounding industrial uses and would engage in a use that has been deemed equivalent to a permitted use. As noted in the Hayward General Plan Discussion #2 above, Energy Commission staff has been unable to identify any project elements that would erode the integrity or appearance of the Industrial Corridor. The project would not, however, operate at a minimum of detriment to surrounding properties (Hayward Executive Airport), as noted in Section 10-1.140 discussion above.

As a result, the proposed project is inconsistent (not in harmony) with various city of Hayward regulations and policies, including Municipal Zoning Code §§10-1.140, 10-1.1620, and 10-6. This is discussed more fully later in this analysis. Upon consideration of the findings required to justify approval of a CUP, Energy Commission staff has determined that all findings cannot be made. Approval of the Eastshore project without meeting the requirements for a CUP would be inconsistent with Hayward Municipal Code §10-1.1620(b)(1)(a) and §10-1.3225.

Parking

AFC Figure 2.2-7, Site and Laydown Area, identifies a location outside of the primary site boundaries, but directly across Clawiter Road from the project site, that would be used for temporary construction laydown and parking during the 12-18 month construction process. This parcel is zoned Industrial, but is not currently used for parking. According to city of Hayward Planning Manager, David Rizk (Hayward 2007e), temporary use of this area for parking and storage of construction materials would not require an administrative use permit, but would normally need a site plan review and approval by the Planning Department prior to the issuance of any building, occupancy, or operational permit. It would also be subject to those conditions deemed reasonably necessary to achieve a beneficial effect, which may include but would not be limited to:

- Site plan architectural requirements, such as building arrangement, safe and efficient access, adequate open spaces, landscaping, screening, parking and yards, shielded lighting, compatible signs, harmonious external building design, and sufficient variety to avoid monotony in external appearance.
- Restrictions on activities and equipment permitted.
- Restrictions on times when activities would be permitted.
- Specified time period within which approval is valid.
- Furnishing of guarantees assuring compliance with conditions.

- Adequate safeguards against the emission of dust, heat, glare, electromagnetic interference, odors, smoke and particulate matter, wastes, refuse, water pollution, and other environmental hazards and pollutants. [HMC(a), §10-1.3130]

Use of an adjacent property for construction parking is convenient for the project's construction workers and alleviates the need to find a significant number of parking spaces in an area that is already impacted. Several surrounding businesses provide large employee parking areas and temporary parking lots are common during construction within the Industrial Corridor. Rather than having a detrimental effect on public health, safety, and general welfare, the addition of dedicated parking, along with condition of certification **TRANS-2**, which would exclude project workers from using street parking and local lots, would mitigate the potential impact resulting from a large influx of temporary workers into an area with inadequate parking for existing businesses. Additionally, other conditions of certification identified in the **Traffic and Transportation** and **Worker Safety** sections would provide safeguards for pedestrians and construction traffic. There is no inconsistency with the use of undeveloped or underutilized property within the Industrial Zoning District for parking or construction materials storage, so long as the proposed use is temporary, is consistent with similar temporary uses in the general vicinity, and would not prevent or limit any existing or future permitted use.

Most of the conditions that would be required by the city of Hayward are already addressed in the Energy Commission's project requirements and conditions of certification, identified in various sections of this FSA, including restrictions on construction lighting and requirements for temporary screening and surface restoration (see **Visual Resources** section). In addition, condition of certification **LAND -1** requires the project owner to submit the final project development plan to the city of Hayward for review and comment, and to the Energy Commission Compliance Project Manager (CPM) for review and approval, prior to the start of construction. Approval and full implementation of the approved development plan would ensure compliance with city of Hayward code requirements, including those for parking, access, and worker safety.

Section 10-6 Airport Approach Zoning Regulations

The purpose of the Airport Approach Zoning Regulations (Section 10-6 of the Hayward Municipal Code) is to promote the health, safety and general welfare of the inhabitants of the city of Hayward by preventing the creation or establishment of airport hazards, thereby protecting the lives and property of the users of the Hayward Air Terminal (now the Hayward Executive Airport) and occupants of the land in its vicinity, and preventing destruction or impairment of the utility of the airport and the public investment therein. It also identifies the Airport Approach Zoning Plan (AAZP) area for the Hayward Executive Airport (formerly the Hayward Air Terminal) that is subject to these regulations. These regulations, as written, are also consistent with and intended to implement, in part, Chapter II(C) and other portions of the ALUPP, as they apply to Hayward Executive Airport. The Airport Approach Zoning Plan map, identified in §10-6.20, is also generally consistent with the Hazard Prevention Zone/General Referral Boundary (also known as the AIA) identified in the ALUPP. Properties within the AAZP, which extends approximately two miles out from the airport runways, and the AIA, with irregular boundaries extending outward up to three miles from the airport, are subject to

restrictions regarding land uses that could present a hazard to aircraft navigation. Hayward Municipal Code §10-6 codifies the ALUPP policies for the Hayward Executive Airport.

Jurisdiction

The area protected under these regulations is identified in §10-6.20 as “all of the land outside the boundaries of the Hayward Air Terminal (*now the Hayward Executive Airport*) and within approximately two (2) miles of the landing area of the airport (*which*) is hereby divided into airport approach zones, airport turning zones, airport transition zones, and airport clear zones, the boundaries of which are shown on a map designated as "The Airport Approach Zoning Plan for Hayward Air Terminal, Hayward, Alameda County, California" (*italics added*)” (see **Land Use Figure 7**). Later references within the regulations refer to the zones created by the AAZP map and referenced in §10-6.20. During Energy Commission staff’s review of the Russell City Energy Center Amendment and analysis of this project, the city of Hayward was queried regarding their interpretation of the Airport Approach Zoning Regulations [CEC 2007(h)]. Although Energy Commission staff’s inquiry did not address the boundaries of the area subject to these regulations, the city’s response (COH 2007k) challenged the validity of the AAZP map cited in the current regulation. Mr. Jesus Armas, former City Manager, indicated that the oval “Traffic Pattern Zone”, as depicted on the current Hayward Executive Airport Master Plan “California Land Use Safety Zones” map (**Land Use Figure 5)**, supersedes the AAZP map identified in the regulations. Using the Traffic Pattern Zone (TPZ) boundaries as a basis, Mr. Armas concluded that the proposed RCEC site was approximately 700 feet outside the TPZ boundaries and, therefore, was not subject to the Airport Approach Zoning Plan regulations. This interpretation was later supported by Mr. Bob Bauman, city of Hayward Public Works Director (COH 2007m). Eastshore would be just outside the TPZ.

Energy Commission staff does not agree with this assessment for the following reasons:

1. Neither Mr. Armas nor Mr. Bauman has the authority to amend, by physical change or interpretation, the current zoning code. Substitution of a significantly different map than referenced in the current municipal code section would constitute an amendment to §10-6.20. Only the Hayward City Council has the authority to amend the regulations, Zoning District Maps, or classification of properties [HMC(a), §10-1.3405], although the city of Hayward Planning Commission can make changes in the AAZP zoning restrictions and boundaries [HMC(c), §10-6.50]. Additionally, as noted in the letter from Mr. Armas, although the crosswind runway has not been in use since prior to 1984, two airport Master Plans have been adopted, and numerous amendments to the zoning code have been implemented over the intervening 23+ years, no action has been proposed or taken by either body to change the map reference in these regulations. There is no codified policy or application of this interpretation to support Mr. Armas’s opinion.

2. Mr. Armas is correct in his assertion that the Airport Master Plans of 1984 and 2002 no longer included reference to the crosswind runway and included a “California Land Use Safety Zones” map. However, nowhere in either Plan is there mention of that map superseding the AAZP map or that the TPZ is synonymous with the AAZP area identified in the regulations. In fact, the area “within approximately two (2) miles

of the landing area of the airport" that is currently subject to these regulations would be significantly reduced if superseded by the TPZ and might no longer be sufficient to protect the lives and property of the users of the Hayward Executive Airport and occupants of the land in its vicinity or prevent destruction or impairment of the utility of the airport, as mandated by the airport regulations.

3. Finally, Mr. Armas asserts that the TPZ is consistent with the California Airport Land use Planning Handbook (Caltrans 2002) and draft update to the ALUPP[5]. While the TPZ is consistent with guidance provided for identifying aviation safety zones within an airport's airspace, it does not identify the TPZ as equivalent to the AIA, with regard to determining land uses that would be compatible with airport operations. It does note, however, that these zones primarily address risks which aircraft accidents pose for people and property on the ground. A separate set of safety compatibility concerns address land use characteristics which can cause an aircraft accident (Caltrans 2002, pp.9-36 through 9-53). The AIA, as identified in Airport Land Use Policy/Compatibility Plans, is the area in which current or future airport-related noise, overflight, safety, and/or airspace protection factors may significantly affect land uses or necessitate restriction on those uses (Caltrans 2002, Appendix I, p.I-1). The reduced boundaries of the TPZ depicted in the Hayward airport Master Plan would not be consistent with the area afforded protection under the AIA, as identified by the ALUPP. Energy Commission staff could find no example of the TPZ or California Land Use Safety Zones map being used in lieu of the AAZP regulatory map.

The proposed project site is just outside the Airport Traffic Pattern Zone for the Hayward Executive Airport (HWD 2002, Exhibit 5B), but it is within the airport's AAZP, AIA, and airspace boundaries (HWD 2002, Airport Layout Plans – Airport Airspace, p.3 of 9). It is Energy Commission staff's conclusion that the proposed Eastshore project site is located within an area subject to city of Hayward §10.6 Airport Approach Zone Regulations.

Impacts

As noted above, the purpose of the city of Hayward Airport Approach Zoning Regulations (HMC(c), §10.6-00) is to:

- Prevent the creation or establishment of airport hazards[6] or obstructions.
- Prevent the destruction or impairment of the utility of the airport and the public investment therein.

[5] The draft update of the ALUPP is still an internal draft document, has not been completely reviewed, approved, or adopted by the Alameda County Airport Land Use Commission (ACALUC), and is still subject to revision. ACALUC staff has requested the draft document not be used as a reference or substantiation for any analysis or conclusion in this or any other public document.

[6] The Hayward Municipal Code §10-6.12 defines an "airport hazard" as any structure or tree or use of land which obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to such landing or taking off of aircraft. §10-6.35 also indicates that use of land within the AAZP cannot "otherwise endanger the landing, take off or maneuvering of aircraft."

As noted in the **Traffic and Transportation** section of this FSA, the proposed project would produce high-velocity, thermal plumes that, if encountered by an aircraft, could result in loss of control and aircraft damage or upset. This would include airplanes in the traffic pattern for Runway (RY) 10R/28L and those using the recommended VFR downwind departure for RY 28L. The implementation of the project would create a hazard within the airport zoning area. Pilots would have to divert their attention from flying their aircraft, looking for other aircraft in the pattern, and obeying instructions from the tower controllers.

The regulations also indicate that land uses that would impair the utility of the airport are incompatible. The utility of an airport depends, in part, on the safe and efficient movement of air traffic and use of the surrounding airspace. Thus, the presence of the power plant would further complicate an already complex airspace, impairing the utility of the airport.

In the earlier discussion of the Hayward Executive Airport Master Plan, it was noted that operations at the Hayward Airport are expected to increase over the next 20 years. This means more aircraft would not be able to use the airspace over the Eastshore plant and congestion would increase in other areas. Thus, in addition to interfering with and restricting existing operations at the Hayward Executive Airport, the project would also restrict future airport operations.

Staff concludes that the project is, therefore, inconsistent with the purpose expressed in §10-6.00 of this regulation, if sited at the proposed location.

Land Use Table 4 provides a summary of the consistency of the Eastshore project with the applicable land use LORS adopted by the state of California, Alameda County, and the city of Hayward, as identified in **Land Use Table 1**. Conditions of certification have been proposed to make the project consistent with the LORS, if feasible. Staff has determined that the project would not comply with all land use LORS. Staff has proposed condition of certification **LAND-1** as a means of verifying that the project, if certified, would be built, to the greatest extent feasible, in accordance with the city of Hayward's minimum Industrial Zoning District standards. However, even full implementation of **LAND-1** would not resolve all project inconsistencies with applicable LORS.

LAND USE Table 4
Project Compliance with Adopted Land Use LORS

Applicable Law	Description	Consistency
Federal	None	
State **State Aeronautics Act**	The State Aeronautics Act (California Public Utilities Code §§21001 *et seq*) gives the California Department of Transportation (Caltrans) and local governments the authority to protect the airspace in California.	Consistency with the State Aeronautics Act, as incorporated in the Alameda County Airport Land Use Policy Plan, is discussed below.
Local		
Alameda County Alameda County Airport Land Use Policy Plan (ALUPP)	The Alameda County Airport Land Use Policy Plan (ACALUPP) provides for the orderly growth of airports and the area surrounding the airports within the jurisdiction of the Alameda County Airport Land Use Commission (ACALUC), excluding existing land uses. Hayward Executive Airport is within the ACALUC's jurisdiction. Noise and safety are the two fundamental compatibility concerns identified in the statutes. Impacts of aircraft overflights in locations beyond the normally mapped noise contours are addressed. Safety compatibility policies address both protection of people and property on the ground near airports and protection of airport airspace from obstructions and other hazards to flight. The Alameda County ALUPP works in concert with the Hayward General Plan and Zoning Codes, and the Hayward Executive Airport Master Plan.	Inconsistent: The Eastshore project would be inconsistent with the intent of the ALUPP to promote orderly expansion of airports and land uses compatible with the airport operations and the safe, efficient use of an airport's airspace.
City of Hayward General Plan (revised 2002)	The Hayward General Plan contains seven elements and is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within city of Hayward jurisdiction**.** The Land Use Element of the Hayward General Plan identifies the goals and policies necessary to maintain and enhance neighborhoods, commercial and industrial areas, and surrounding open space. The Economic Development Element identifies the current economic conditions, constraints, and opportunities in the city of Hayward and, in conjunction with Land Use, Circulation, and Housing Elements, provides guidance when considering specific projects and analysis of long-term impacts. Hayward Executive Airport development and operations are discussed in the Airport Master Plan (see below).	Consistent: The Eastshore project is consistent with the goals and policies of the 2002 city of Hayward General Plan
Hayward Executive Airport Master Plan (revised 2002)	This plan identifies the current operational status for the Hayward Executive Airport, including descriptions of airport airspace, flight procedures, and current aviation uses. It also includes projections of future use and proposes development plans to accommodate that increased use through the 20-year planning period for this Master Plan.	Eastshore project consistency with this Master Plan is determined primarily by consistency of the project with various airport-related City of Hayward Municipal Code sections. Unlike the General Plan, there are no applicable land-use-related goals, policies, or strategies included in this document.
Municipal Code	The city of Hayward Municipal Code, Chapter 10 contains	§10-1.135 - Industrial Zoning District height restrictions,

§§10-1 *et seq*	ordinances that deal with planning, zoning, and subdivision standards, requirements, and restrictions. Article 1 of this chapter, also known as the Hayward Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Hayward General Plan, pursuant to the mandated provisions of State Planning and Zoning Law, California Environmental Quality Act (CEQA), and other applicable state and local requirements [HMC(a)]. The following sections are specifically applicable to the proposed project: • §10-1.135 Exceptions (*to General Provisions of the Zoning Code*) • §10-1.140 Exclusionary Zoning Ordinance • §§10-1.1600 *et seq* - Industrial District (I); identifies permitted uses, standards, and restrictions applicable to development in those areas zoned Industrial. • §10-1.3200 Conditional Use Permits, identifies the procedures for reviewing and conditioning projects requiring a conditional use permit before they can be approved and occupied, or before business can be conducted.	setbacks, and minimum design and performance standards do not apply to the project's transmission line and underground pipelines. <u>Inconsistent</u>: §10-1.140 - The Eastshore project would result in impacts that are more objectionable than other uses within the Industrial District that would create less of a detriment to surrounding properties (e.g. airport). Therefore, siting of the project at the proposed location is inconsistent with §10-1.140. <u>Inconsistent</u>: §§10-1.1600 *et seq* – The Eastshore project would not be consistent with the requirements of §§10-1.1600 *et seq*, in that a CUP is required for this use and all findings to approve a CUP could not be made. Condition of certification **LAND -1** is proposed as a means of verifying that the project would be built in accordance with the City's minimum Industrial Zoning District standards, to the greatest extent feasible. However, even full implementation of **LAND-1** would not resolve all project inconsistencies with §10-1.1600 requirements (see <u>Section 10-1.3200)</u> <u>Inconsistent</u>: §10-1.3200 - The proposed project is inconsistent (not in harmony) with various city of Hayward regulations and policies, including Municipal Zoning Code §§10-1.140, 10-1.1620, and 10-6. All findings required to justify approval of a CUP cannot be made. Approval of the Eastshore project without meeting the requirements for a CUP would be inconsistent with Hayward Municipal Code §10-1.1620(b)(1)(a) and §10-1.3225.
Municipal Code §10-6 - Airport Approach Zoning Regulations	This code section (per Hayward City Council Resolution #64-038; 9/15/64) is intended to prevent the creation or establishment of airport hazards[8], thereby protecting the lives and property of the users of the Hayward Executive Airport and of the occupants of the land in its vicinity, and prevent destruction or impairment of the utility of the airport and the public investment therein.	<u>Inconsistent</u>: The Eastshore plumes could be a hazard to aircraft at traffic pattern altitude flying over the project site. The project has the potential to directly impair the utility of the airport by increasing the complexity of the airspace. The project is, therefore, inconsistent with the purpose expressed in §10-6.00 of this regulation, if sited at the proposed location.

[8] The Hayward Municipal Code §10-6.12 defines an "airport hazard" as any structure or tree or use of land which obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to such landing or taking off of aircraft.

Land Use Compatibility

The project would be located within the city's Industrial Corridor, in an area that supports both heavy and mixed industrial/commercial activities (see **Land Use Figure 1**). The proposed project site has a General Plan land use designation of Industrial Corridor and, as an "equivalent" manufacturing use, is consistent with other uses currently permitted within that land use designation. Surrounding properties are used primarily for manufacturing, warehousing, and small wholesale, retail, and construction businesses. Only scattered residences or other potentially sensitive receptors are within one-third mile of the proposed facility. As noted in the Section 10-1.1600 discussion above, the primary purpose of the Industrial Corridor and Industrial Zoning District designations is to identify and encourage industrial development in areas suitable for this type of use.

When a jurisdictional authority, such as the city of Hayward, establishes zoning districts, it is that agency's responsibility to ensure the compatibility of adjacent zoning districts and permitted uses, and incorporate conditions and restrictions that ensure those uses will not result in a significant adverse impact ("minimum of detriment") to surrounding properties. It is, therefore, assumed that permitted industrial uses, per HMC §10-1.1600, or those deemed equivalent to a permitted use, sited on properties zoned Industrial within the Industrial Corridor, are compatible with surrounding uses and zoning districts. Those uses operating under a valid use permit would also be considered compatible.

Administrative or conditional use permitting requirements (see Section 10-1.3200 above) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses. As noted in several sections above, the proposed project would not be compatible with existing Hayward Executive Airport operations.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, or the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as "within 1000 feet" of a school (California Health & Safety Code §§42301.6-9) or within 0.25 miles of a sensitive receptor, under CEQA. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There are five schools [Life Chiropractic College West (LCCW), ITT Technical Institute, Eden Gardens Elementary School, Anthony W. Ochoa Middle School, and Lea's Montessori Christian School] within a one-mile radius of the project site. The closest,

LCCW, is located less than 1,000 feet east of the proposed plant site, but does not serve young, school-age children. LCCW and ITT are designated vocational/trade schools which were approved as a compatible use within the Industrial Corridor through the City of Hayward administrative use permitting process. Ochoa Middle School, the closest public school, is located approximately one-half mile east of the site. The Eastshore AFC, Appendix 8.1D, Table 8.1D-4 and Figure 8.1D-1 also indicate the presence of the Mohrland School, at a distance of approximately one-half mile northeast of the project site. However, Energy Commission staff's visual inspection of the area determined the school is no longer in operation. None of the schools, except LCCW, are within the 1000 feet/¼-mile proximity threshold.

Other potential sensitive receptors within one mile of the project site include Eden West Convalescent Hospital and Senior Group Home (approximately one mile northeast) and the Waterford Apartments (approximately 1,850 feet east). Although one residence is located less than ¼-mile from the proposed site, most residences are located east of Industrial Blvd., outside the Industrial Corridor, and approximately one-half mile or more to the east-northeast of the proposed project site.

The project's location, in the center of the eastern Industrial Corridor area, provides a buffer of approximately one-half mile from most areas zoned for residential, public, and retail commercial use. Residences are no longer a permitted use in the Industrial Zoning District, except for on-site living quarters for security personnel. There are individual isolated residences within the Industrial Corridor, but these are non-conforming uses that lawfully existed when the area was rezoned Industrial and were allowed to remain, with certain restrictions [HMC(a), §10-1.2915]. The closest single family residence is located approximately 1,120 feet northeast of the project site. All sensitive receptor sites, with the exception of the LCCW and the residence listed above, are located more than one-half mile from the proposed project location.

Energy Commission staff has determined that, based on analyses cited in other sections of this document, consideration of the zoning and land use designations for the project site and surrounding locations, and distance of the project site from known sensitive receptors, the Eastshore project would not result in a significant project-related impact at any sensitive receptor location. (Also see the **Air Quality, Hazardous Materials, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections of this document for a complete discussion of noise, dust, public health hazards or nuisance; and adverse traffic or visual impacts).

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [CCR 2006, §15065(A)(3)].

As noted in the AFC §8.4.7, the area in the vicinity of the proposed project site is essentially built out. The plant would be constructed on an existing parcel and would replace a vacant, deteriorating warehouse structure. The proposed project would not require a General Plan amendment, Zoning amendment, or other changes or

concessions that would alter the development standards, availability of permits, or use of the project site or surrounding properties.

The Eastshore project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve Pacific Gas & Electric Company's existing and anticipated electrical needs.

The Russell City Energy Center (RCEC), a 600-megawatt, natural gas-fired, combined-cycle power plant, has been approved for a site approximately 3,000 feet west of the Eastshore location. Certification of both the Eastshore and RCEC projects would result in the construction and operation of two power plants within the southwest quadrant of the Hayward Executive Airport's airspace. In conjunction with staff's mitigation in the RCEC proceeding (no overflight of the project site less than 1,000 feet AGL), and the FAA's recommendation that this be applied to Eastshore as well (FAA 2007b), the cumulative effect of both projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. Adding another power plant that would generate additional plumes could be hazardous to aircraft below 1,000 feet AGL. Potential mitigation such as pilots seeing and avoiding both power plants is impractical and in some cases unattainable. Therefore, Energy Commission staff concludes that the project could, in conjunction with operation of the RCEC project, have a significant cumulative impact that could not be avoided if the proposed project is developed.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received numerous comments from the city of Hayward and the general public regarding the suitability of the Clawiter Road location for the proposed project. In addition, the Hayward City Council has passed a Resolution, with supporting reports from the City of Hayward Planning Department (COH 2007b, c, d), that determined the Eastshore project to be inconsistent with the Hayward General Plan and Industrial Zoning District.

From a land use perspective, the greatest concern expressed by the city of Hayward is that the facility is not consistent with the transition of this portion of the Industrial Corridor from a manufacturing base to one based more on information technologies, as envisioned by the city of Hayward. Energy Commission staff has found no codified basis or physical examples to support this conclusion. The proposed Eastshore project location is situated in the center of the eastern sub-area of the city's Industrial Corridor, is zoned Industrial, and is surrounded by a mix of industrial, manufacturing, and commercial uses. According to the city's Industrial Zoning Code, as expressed in HMC §10-1.1605, the Industrial Corridor was designated to "provide for and encourage the development of industrial uses in areas suitable for same, and to promote a desirable and attractive working environment with a minimum of detriment to surrounding properties." (See complete discussion of these issues in the General Plan section above) These issues were discussed with city representatives at several public meetings, but no consensus was reached.

Regarding inconsistency with the Industrial Zoning District requirements, the same City Council resolution and evaluation of the project by the city of Hayward Planning

Department indicated the project "would result in a facility that would not promote a desirable and attractive working environment with a minimum of detriment to surrounding properties." This appears to be a primarily subjective determination, although the City cites concerns regarding visual, air quality, and hazardous materials as a basis for this determination ([See complete discussion of these issue in the Section 10-1.1600 Industrial District (I) above and in the **Visual Resources, Air Quality,** and **Hazardous Materials** sections of this PSA.] These issues were discussed with city representatives at several public meetings, but no consensus was reached. The project would meet all design requirements for the Industrial District, including landscaping, to integrate the facility into the surrounding neighborhood.

AGENCY COMMENTS ON THE PSA

Two agency comments were received on the PSA relative to land use issues.

City of Hayward

In a letter dated October 9, 2007, the city had several comments related to land use. It disagreed with staff's conclusion that the proposed project is consistent with the applicable 2002 General Plan policies. Staff still supports this conclusion. Staff agrees with the second comment that the project is located in the eastern portion of the industrial corridor. The city also believes that staff ignored Hayward General Plan language encouraging separation of businesses using hazardous materials from residential areas. Staff believes that the project's hazardous materials would be separated from residential areas in that the closest residence is located approximately 1,120 feet northeast of the project site, and the nearest residential neighborhood is more than one-half mile from the project site. There is an additional comment that staff has not referred to language in the General Plan regarding transformation of the industrial corridor. Staff has reviewed the relevant language and believes the project is consistent with the policy of concentrating similar types of uses such as manufacturing (i.e. power plants). In response to another comment by the city, staff continues to believe that the project is consistent with the Strategy 2(7) of the Economic Development Chapter of the Hayward General Plan. Finally, staff believes that the project stack heights are comparable to other facilities within 0.5 miles.

FAA

Staff has reviewed an October 9, 2007 letter from the FAA that notes the potential for constraints to airport operations related to Eastshore thermal plumes that create a tangible impact on the future use of the Hayward Executive Airport if the facility is approved at the proposed site. Staff agrees with this statement.

Public Comment

Staff has been advised by the California Association of Pilots that they are concerned about the Eastshore project site being within one mile of the Hayward Airport (staff believes its just outside a mile) and it would limit airspace use. They are also concerned that the project would violate the city of Hayward's agreement to keep the airport free of hazards as noted in two grant assurances with the FAA. These involve hazard removal, mitigation and compatible land uses. These issues were discussed in the Alameda County LUPP and Hayward General Plan sections of this analysis.

CONCLUSIONS AND RECOMMENDATIONS

- Siting of the Eastshore Energy Center (Eastshore) facility at the proposed location within the Hayward Executive Airport's Airport Approach Zoning Plan (AAZP) is inconsistent with the purpose expressed in Hayward Municipal Code §10-6.00. It is also inconsistent with the Alameda County Airport Land Use Policy Plan (ALUPP) to promote land uses compatible with the airport operations and the safe, efficient use of an airport's airspace.
- The Eastshore project could be a hazard to aircraft (small planes and helicopters) flying over the site at less than 1,000 feet above ground level (AGL) which would be more objectionable than other uses within the Industrial District. Therefore, siting of the project at the proposed location is inconsistent with Hayward Municipal Code §10-1.140.
- The Alameda County Airport Land Use Commission adopted a resolution that recommended that the Eastshore project be located at an alternate site outside the Airport Influence Area for the Hayward Executive Airport.
- The project would interfere with and restrict existing and future operations of the Hayward Executive Airport. This is a significant adverse direct impact for land use.
- The cumulative effect of the Eastshore and nearby Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. Potential mitigation such as pilots seeing and avoiding both power plants is impractical and in some cases unattainable. The FAA notes that the potential for constraints to airport operations create a tangible impact on the future use of the Hayward Executive Airport if the facility is approved at the proposed site. Energy Commission staff concludes that the project's incremental effect, in conjunction with the operation of the RCEC project, is cumulatively considerable.
- Power plant operation, as proposed in this Application for Certification (AFC), is consistent with the primary use classification of "manufacturing" in the Industrial Zone, but, due to certain operational elements, would normally require a conditional use permit (CUP) to be sited at the proposed location. However, the project is inconsistent (not in harmony) with various city of Hayward regulations and policies, including Municipal Code §§10-1.140, 10-1.1620, and 10-6. Upon consideration of the findings required to justify approval of a CUP, Energy Commission staff has concluded that all the necessary findings cannot be made. Approval of the Eastshore project without meeting the requirements for a CUP would be inconsistent with the Municipal Code §10-1.1620 (b)(1)(a) and §10-1.3225.
- The Eastshore project would not physically disrupt or divide an established community or conflict with any applicable habitat conservation plan or natural community conservation plan; result in any impacts to existing agricultural operations or future use; convert farmland to non-agricultural use; or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project is consistent with the Hayward Area Shoreline Plan and is not subject to the San Francisco Bay Plan or BCDC jurisdiction. There is no other

regulatory Habitat or Natural Community Conservation Plan that is specifically applicable to this project.

- The proposed project is consistent with the applicable 2002 General Plan policies and strategies and the project's proposed location is zoned Industrial, which is consistent with the Industrial Corridor General Plan land use designation. Energy Commission staff is proposing Condition of Certification **LAND-1** to ensure the project is constructed and operated in accordance with the city's minimum Industrial Zoning District standards, to the extent feasible.

If the California Energy Commission approves the project, Energy Commission staff is proposing Condition of Certification **LAND-1** to ensure the project is constructed and operated in accordance with the city's minimum Industrial Zoning District standards, to the extent feasible.

PROPOSED CONDITION(S) OF CERTIFICATION

LAND-1 The project owner shall ensure that the project and its associated facilities, including the temporary construction parking and laydown area(s), are constructed and operated in compliance with the city of Hayward's Industrial Zoning District's lot and yard requirements, height limits, and minimum design and performance standards; and other applicable municipal code requirements.

The project owner shall submit a development plan to the city of Hayward Planning Department in sufficient time for review and comment, and to the Energy Commission's Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction. The development plan shall include all elements normally required for review and permitting of a similar project, including site plan, structural dimensions, design and exterior elevation(s), and proof of any required permits.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant project site or its associated easements, the project owner shall submit the proposed development plan to the city of Hayward Planning Department for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the city of Hayward.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the local jurisdiction, along with any changes to the proposed development plan, to the CPM for review and approval.

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HMC(b). Subdivisions Ordinance, Chapter 10, Article 3; City of Hayward Municipal Code.

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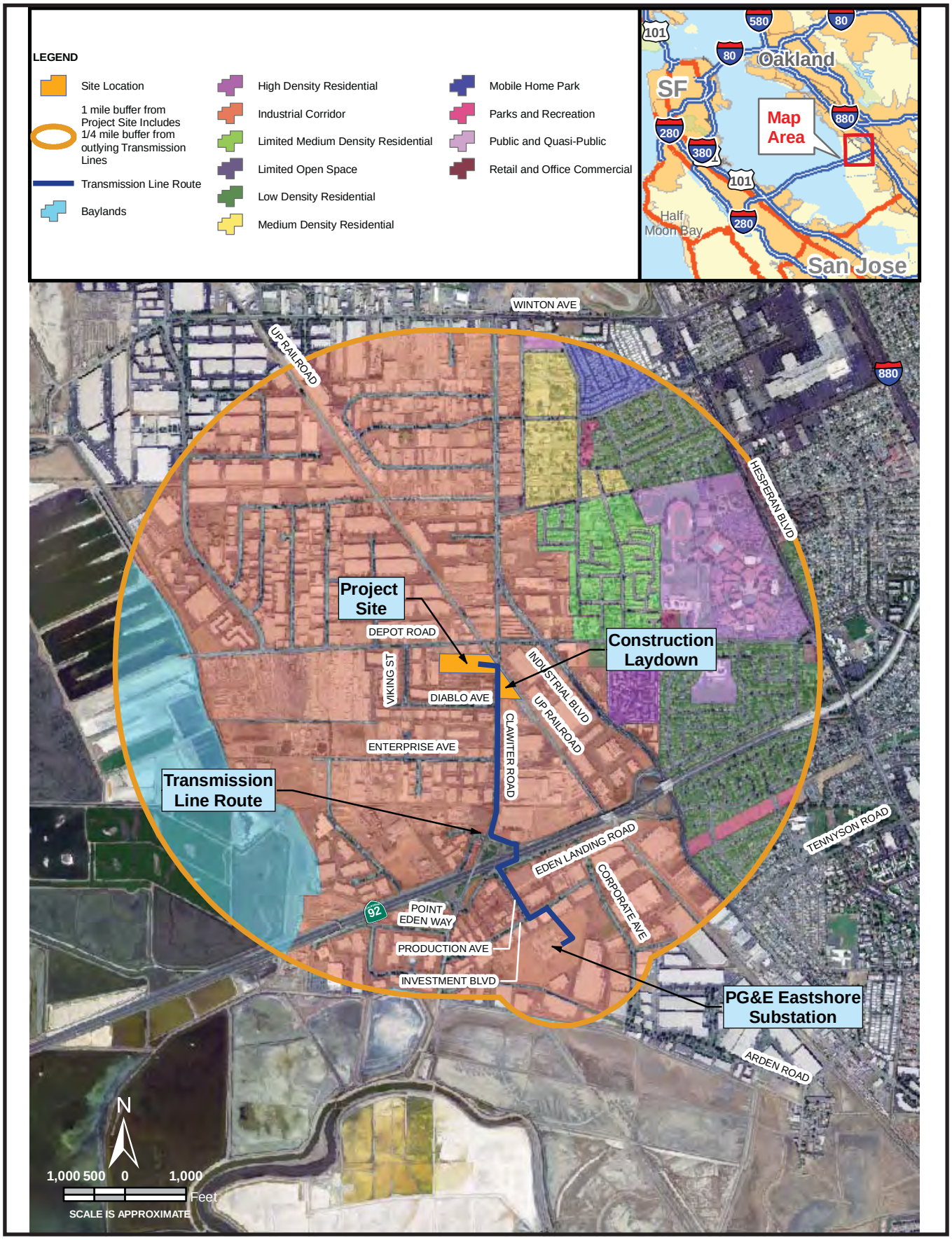
PUB. UTIL. CODE(a). State Aeronautics Act (California Public Utilities Code §§21001 et seq).

LAND USE - FIGURE 1

Eastshore Energy Center - City of Hayward General Plan Land Use Designation

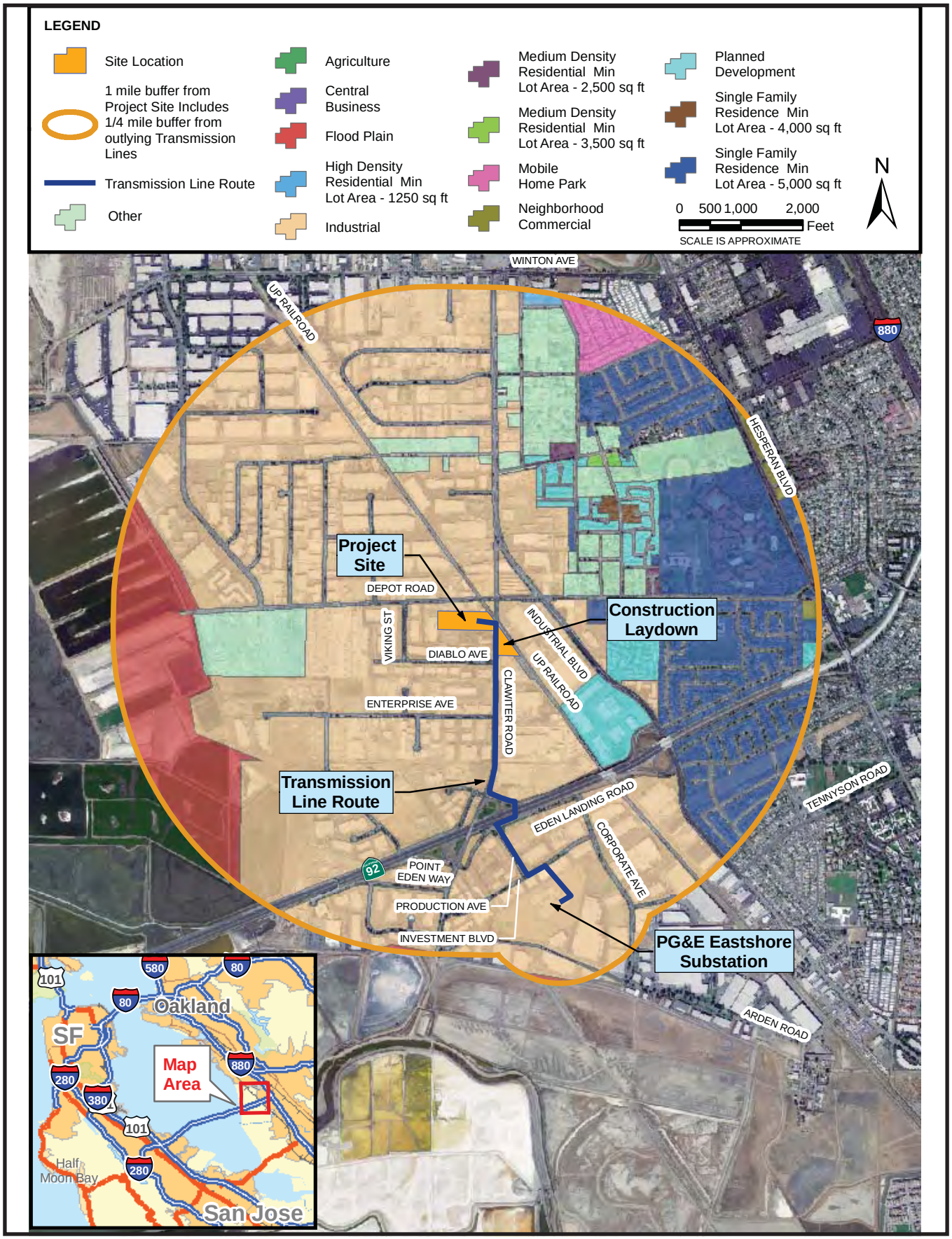


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 8.4-1

LAND USE - FIGURE 2

Eastshore Energy Center - City of Hayward Zoning District Designations

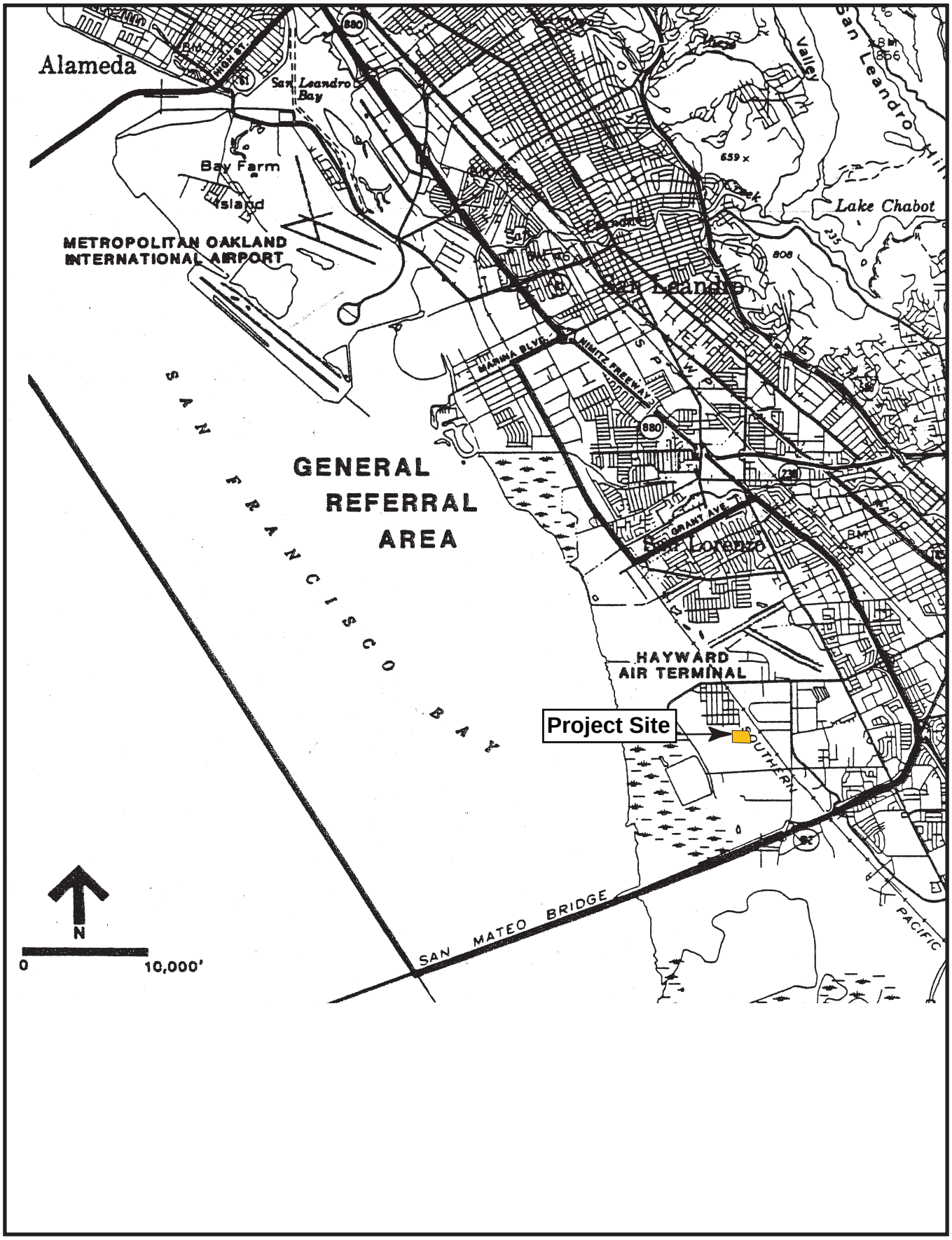


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 8.4-2

LAND USE - FIGURE 3

Eastshore Energy Center - Hayward Executive Airport Influence Area*



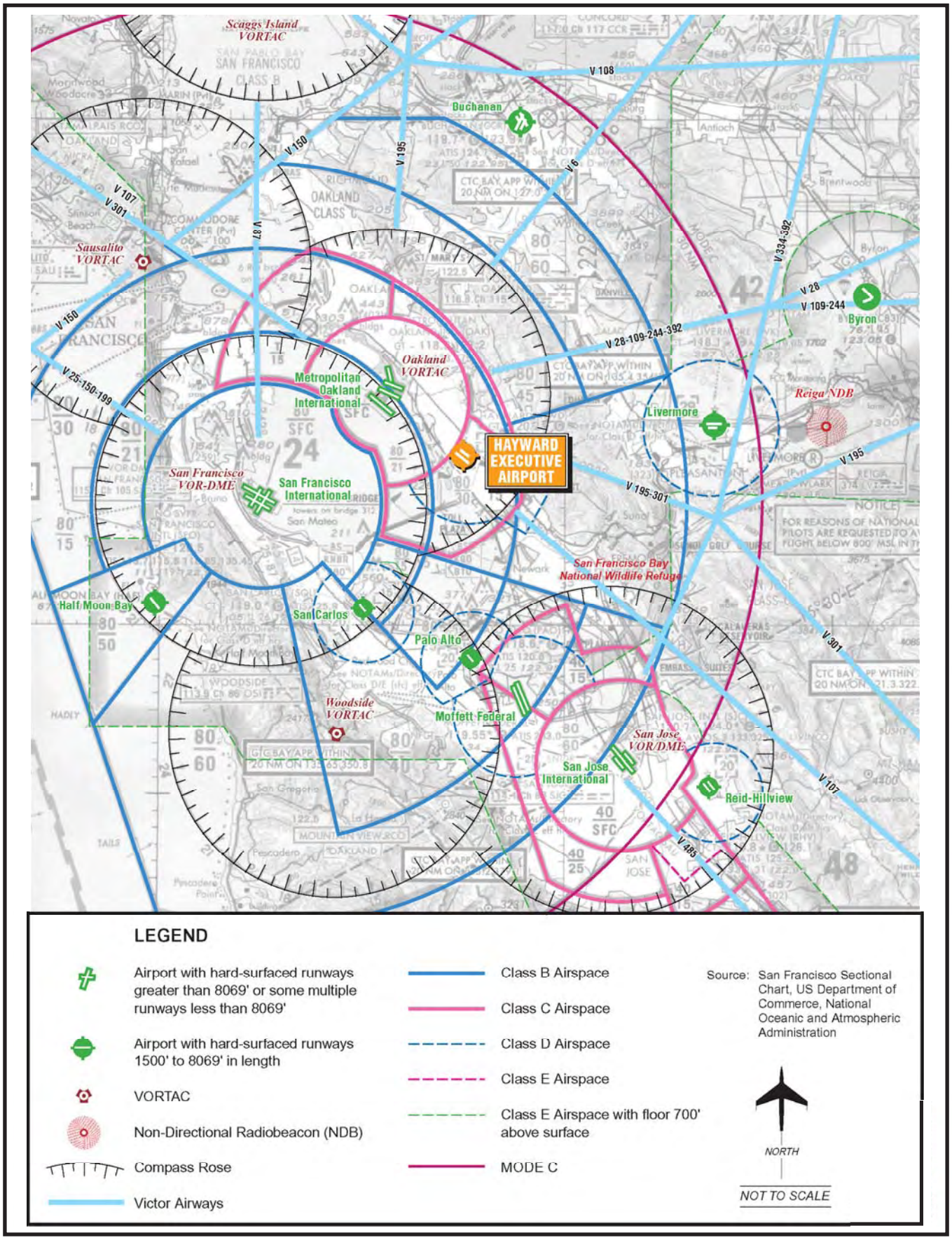
CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Alameda County Airport Land Use Policy Plan (ACALUC 1986), adopted by the Alameda County Land Use Commission on July 16th, 1986 - Figure XV

* Also referenced as the General Referral Area/Hazard Protection Area in the ALUPP

LAND USE - FIGURE 4

Eastshore Energy Center - Hayward Executive Airport Area Airspace



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Master Plan - Final Technical Report (HWD 2002), prepared by Coffman Associates, Inc., Airport Consultants, in association with Environmental Science Associates (ESA); April 2002; Exhibit 1E, Area Airspace.

LAND USE - FIGURE 5

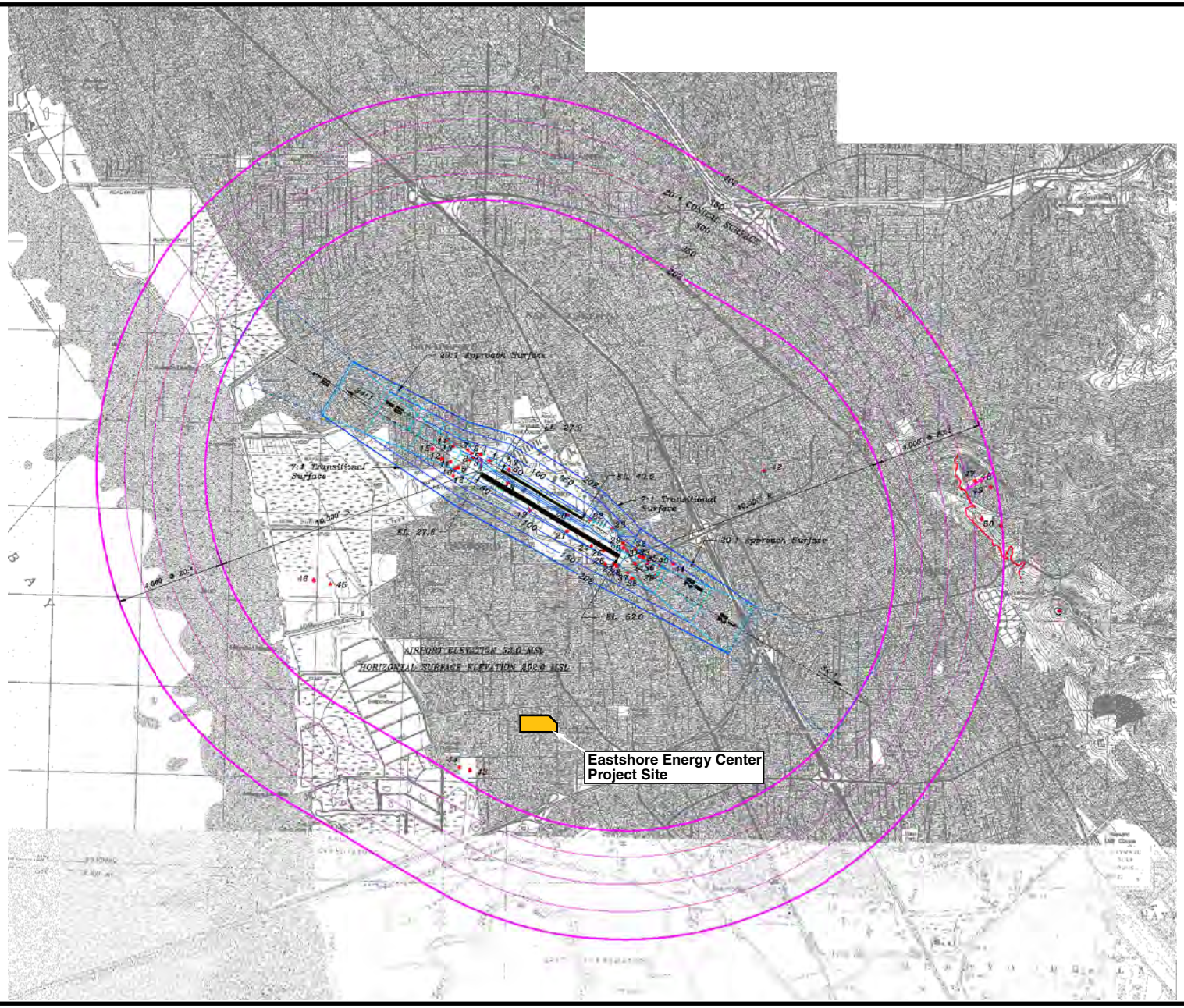
Eastshore Energy Center - Hayward Executive Airport Safety Zones

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: Hayward Executive Airport Master Plan - Final Technical Report (HWD 2002), prepared by Coffman Associates, Inc., Airport Consultants, in association with Environmental Science Associates (ESA); April 2002 ; Airport Plans, Exhibit 5B

LAND USE - FIGURE 6

Eastshore Energy Center - Hayward Executive Airport Airspace Drawing



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Master Plan - Final Technical Report (HWD 2002), prepared by Coffman Associates, Inc., Airport Consultants, in association with Environmental Science Associates (ESA); April 2002 ; Airport Plans, Airport Layout Plans, 3 of 9

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Eastshore Energy Center (Eastshore), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment, that would avoid any significant adverse impacts.

INTRODUCTION

The construction and operation of any power plant creates noise or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The 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 Eastshore project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations and standards (LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

NOISE Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	**Protects workers from the effects of occupational noise exposure**
U.S. Environmental Protection Agency (USEPA)	**Assists state and local government entities in development of state and local LORS for noise**
State:	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	**Protects workers from the effects of occupational noise exposure**
Local:	
City of Hayward General Plan, Appendix N	**Establishes acceptable noise levels for various land-use categories.**

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) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (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.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

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 associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (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 governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal 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 five A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

City of Hayward General Plan

The project is located within the City of Hayward. The City of Hayward General Plan (COH 2002) applies to this project. Appendix N of this plan, *Noise Guidelines for Review of New Development*, contains land use compatibility guidelines. It states that the maximum acceptable exterior noise level in single-family residential areas is a day-night level (L_{dn}) of 55 dBA and the maximum acceptable exterior noise level in the commercial building land use category is a day-night level (L_{dn}) of 70 dBA. These guidelines also require the evaluation of mitigation measures for projects that would cause the L_{dn} level to increase by 3 dBA or more in an existing residential area (COH 2002; EEC 2006a, AFC § 8.5.3.3.1, Table 8.5-4). These requirements apply to operational noise and not to construction noise.

SETTING

The proposed Eastshore project site is located at 25101 Clawiter Road in the City of Hayward, Alameda County, California. The land use designation of the project site is industrial (see **Noise Figure 1**). The immediate project area consists of primarily industrial and commercial uses, with residential uses farther away. Sources of noise in the area include heavy truck traffic on local roads and aircraft traffic from both Hayward Municipal Airport and Oakland International Airport (EEC 2006a, AFC § 8.5.4).

Sensitive noise receptors[1] in the vicinity of the project include residential communities located east/northeast of the site and the commercial building south of the project site property near monitoring location R2. The nearest residence (near ambient noise monitoring location R1) is located approximately 1,100 feet from the proposed project.

For purposes of evaluating impacts on residential uses, the project noise is compared with measured nighttime ambient noise levels, when residents are trying to sleep.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item 3, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor, including those receptors that represent the area's minority population.

Staff has concluded that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is clearly significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

[1] A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level;[2]
2. the duration and frequency of the noise;
3. the number of people affected; and
4. the land use designation of the affected receptor sites.

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

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities is limited to daytime hours.

Staff uses the above method and threshold to protect the most sensitive populations, including the area's minority population.

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (EEC 2006a, AFC § 8.5.4.1; Tables 8.5-5, 8.5-6; Figure 8.5-1). This survey was performed from Monday, July 31 through Tuesday, August 1, 2006, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following two locations, shown in **Noise Figure 2**:

1. Location R1: The front yard of the closest residence to the site, located at 2765 Depot Road, approximately 1,100 feet from the project site. This location was monitored continuously from 5:00 p.m. on July 31 through 5:00 p.m. on August 1, 2006.

2. Location R2: Located at the southern property boundary of the proposed project site adjacent to the commercial building, Fremont Bank's Operational Center (the Bank), directly south of the site. The distance from the center of the project site to the Bank is approximately 330 feet (CH2MHill 2007h). This location was monitored continuously from 5:00 p.m. on July 31 through 5:00 p.m. on August 1, 2006.

As explained above, the noise environment in the vicinity of the project site is dominated by transportation-related sources - truck and aircraft traffic.

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[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

[3] Noise that draws legitimate complaint.

NOISE Table 2 summarizes the ambient noise measurements (EEC 2006a, AFC § 8.5.4.1; Tables 8.5-5, 8.5-6).

NOISE Table 2
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA			
	Day-Night L_{dn}	Average During Nighttime Hours[1] L_{90}	Average During Daytime Hours[2] L_{90}	Average During Daytime Hours[2] L_{eq}
R1, Residence at 2765 Depot Road	63	44		60
R2, Proposed Project Site	67		50	62

Source: EEC 2006a, AFC § 8.5.4.1; Tables 8.5-5, 8.5-6
1. Staff calculations of average of four quietest consecutive hours of the nighttime (see NOISE APPENDIX A)
2. Staff calculation of average of the daytime hours (see NOISE APPENDIX A)

DIRECT IMPACTS AND MITIGATION

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

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. Construction of the Eastshore project is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities (EEC 2006a, AFC § 8.5.4.2.2).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The applicant has predicted construction noise levels; they are summarized here in **NOISE Table 3**. Note that, while the applicant provided estimates at a distance of 375 feet, staff has translated these figures into predicted noise levels at 1,100 feet (R1), the closest sensitive residential receptor location, and at 330 feet, the Bank, the closest office building.

NOISE Table 3: Predicted Construction Noise Levels

Receptor/Distance	Highest Construction Noise Level (dBA) [1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [2]	Cumulative	Change
R1/1,100 feet	62	60	64	+4
Bank/330 feet	71	62	72	+10

Sources: [1] EEC 2006a, AFC Table 8.5-8; and staff calculations (see NOISE APPENDIX A)
[2] NOISE Table 2, above

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

The applicant commits to performing noisy construction work during the daytime hours of 7:00 a.m. to 7:00 p.m. (EEC 2006a, AFC §§ 8.5.3.3.1, 8.5.7.3) in compliance with the City of Hayward General Plan. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

The noise impacts of the Eastshore project construction activities will comply with the noise LORS.CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **NOISE Table 3**, above, construction noise at the residential units near monitoring location R1 may reach 62 dBA. The average ambient daytime L_{eq} level at this location, as seen in **NOISE Table 3**, above, is 60 dBA. The addition of the highest construction noise to the ambient would result in 64 dBA, an increase of 4 dBA over the ambient level. As explained above, staff considers an increase in background noise levels of up to 5 dBA to be less than significant. Also, because construction noise is temporary and construction activities will occur during daytime hours, the noise effects of plant construction are considered to be less than significant at R1.

Also as seen in **NOISE Table 3**, above, construction noise may reach 71 dBA at the Bank. The average ambient daytime L_{eq} level at this location, as seen in **NOISE Table 3**, above, is 62 dBA. The addition of the highest construction noise to the ambient would result in 72 dBA, an increase of 10 dBA over the ambient level. Even though construction noise is temporary in nature, some of the noisiest construction activities could continue for as long as 15 days or longer, which could be intrusive if they increase the ambient noise level by 10 dB or more. As staff understands, the Bank is a data processing center. The typical interior noise level at a data processing center is 60 dBA (see **NOISE Table A2**). Typical noise attenuation provided by common building structures ranges from 20 dBA to 40 dBA (with closed doors and windows) depending on the structural material and age of the building. Because the Bank is a secure facility, staff believes the windows and doors are closed during much of the time. And because the building is relatively new, staff concludes the attenuation would likely be between 30 dBA and 40 dBA. Therefore, during the noisiest construction activities, when the

exterior noise level at the Bank can reach 72 dBA, the contribution of this noise level to the interior noise level would not likely exceed 42 dBA (assuming the lowest attenuation value in the above range). This level of noise would not be audible inside a typical data processing facility (such as the Bank) where the typical interior noise level is 60 dBA.

To ensure the project construction will create less than significant adverse impacts at the most noise-sensitive receptors, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding construction noise.

In light of the following proposed conditions of certification, the noise impacts of the Eastshore project construction activities will be less than significant.

Linear Facilities

New off site linear facilities would include approximately 1.1 miles of transmission line interconnecting to PG&E's Eastshore Substation, and approximately 200 feet of off site natural gas line connecting to PG&E Line 153 (EEC 2006a, AFC §§ 2.1, 8.5.1).

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, construction activities will be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant anticipates that pile driving will not be required for construction of the Eastshore project (EEC 2006a, AFC, § 8.5.5.2.3). Therefore no vibration impacts are expected.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (EEC 2006a, AFC Table 8.5-3; §§ 8.5.3.1.2, 8.5.5.2.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of the Eastshore project include engine generators and their exhaust stacks, combustion air inlets, cooling radiator fans, electrical transformers, and various pumps and fans. Staff compares the projected project noise with applicable LORS, in this case the City of Hayward General Plan. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Proposed noise mitigation measures include the following (EEC 2006a, AFC § 8.5.1):

- acoustically engineered main building that encloses all 14 engines;

- stack silencing; and
- low-noise radiator sets.

In addition, the applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (EEC 2006a, AFC § 8.5.5.3.3).

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (EEC 2006a, AFC § 8.5.5.3.2, Table 8.5-10). Project operating noise is predicted not to exceed 49 dBA at monitoring location R1 (representing the closest residential receptors) during full load operation (EEC 2006a, AFC § 8.5.5.3.2). Also, project operating noise is predicted not to exceed 70 dBA at the northern wall of the north building of the Bank (closest to the project site) during full load operation (CH2MHill 2007h).

As explained above, Appendix N of the City of Hayward General Plan (COH 2002) states that the maximum acceptable exterior noise level in single-family residential areas is an L_{dn} of 55 dBA. The L_{dn} scale is the average noise level during a 24-hour day, obtained after the addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m. It accounts for the higher sensitivity to noise in the nighttime, when people are generally sleeping. The general plan guidelines also require the evaluation of mitigation measures for projects that would cause the L_{dn} level to increase by 3 dBA or more in an existing residential area. They also state that the allowable noise level shall be adjusted up to the ambient noise level. The ambient noise level of 63 dBA L_{dn} at R1 (see **NOISE Table 2** above) exceeds the established limit of 55 dBA L_{dn}, and therefore becomes the new allowable noise level. For a constant noise source, such as a power plant, 63 dBA L_{dn} is equivalent to 57 dBA L_{eq}. Staff uses this value to compare the project noise impact at R1. The predicted project noise level at R1, or 49 dBA, combined with the ambient level of 57 dBA L_{eq}, results in 58 dBA L_{eq}. This represents an increase of only 1 dBA in the ambient noise level, which is not noticeable. The increase is also less than the 3 dBA threshold that would require the evaluation of mitigation measures required by the general plan. Therefore, noise due to the operation of the Eastshore project would be in compliance with the LORS at R1.

Also as explained above, Appendix N of the City of Hayward General Plan (COH 2002) states that the maximum acceptable exterior noise level in the commercial building land use category is an L_{dn} of 70 dBA. For a constant noise source, such as a power plant, this is equivalent to 64 dBA L_{eq}. The predicted project noise level at the Bank, or 70 dBA, combined with the ambient level of 62 dBA L_{eq}, results in 71 dBA L_{eq}. This violates the LORS by 7 dBA. In order to comply with the 64 dBA L_{eq} limit, the project's operational noise level alone must not be allowed to exceed 60 dBA at this location.

To ensure compliance, staff proposes Condition of Certification **NOISE-4**. This condition states that if the project's noise levels alone exceed the above limit of 46 dBA at R1 or the above limit of 60 dBA at the Bank, mitigation measures shall be implemented to bring the noise levels into compliance with these limits. Examples of typical mitigation measures are erection of sound walls around the noisiest equipment, operating fewer

engines simultaneously, and increasing exhaust stack and inlet air silencing. Staff believes these measures and other standard noise mitigation measures typically used throughout the industry can mitigate the project's noise impacts to a level of compliance.

To ensure compliance, staff also proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process requiring the applicant to resolve any problems caused by operational noise.

With implementation of the following conditions of certification, noise due to the operation of the Eastshore project would be in compliance with the applicable LORS.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that make up most of the noise environment. Power plant noise therefore contributes to, and becomes a part of, background noise levels, or the sound heard when most intermittent noises stop. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff typically compares projected power plant noise to existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

In most cases, a power plant operates around the clock for much of the year. Nighttime operation of a peaking power plant like the Eastshore project, though rare, could occasionally occur, which could annoy nearby residences. For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise levels to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors (near R1).

Combining the ambient noise level of 44 dBA L_{90} (**NOISE Table 2**, above) with the project noise level of 49 dBA at R1 would result in 50 dBA L_{90}, 6 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA as a less-than-significant impact. An increase of between 5 and 10 dBA is considered adverse, but may be either significant or insignificant depending upon the particular circumstances of a case, such as the duration and frequency of the noise as well as the resulting noise level. The above noise modeling performed by the applicant was developed using source input from manufacturers' data. In the Preliminary Staff Assessment (PSA), staff stated that the estimated value of 49 dBA at R1 is considered to be conservative since most noise prediction models overestimate actual noise levels by several decibels and that the actual field measurements will likely result in a lower value. This statement was based

on the general understanding that to guarantee their products, manufacturers typically overestimate actual noise levels. Staff concluded in the PSA that the above projected increase of 6 dBA in the ambient noise level will likely prove to be less than 6 dBA by several decibels and further concluded that the operational noise from this project would create a less-than-significant impact at the most sensitive noise receptors. At the PSA workshop, the workshop participants, including members of the public, expressed their strong concerns about the adverse impact of a 6 dBA increase in the nighttime ambient noise levels at the residential receptors. Therefore, staff decided to further examine the above conclusion. Staff conducted research in an attempt to locate any study that would support the above conclusion specifically addressing the Wärtsilä equipment, such as those engines chosen for the Eastshore project, but did not find such a study. For this reason, at this time, staff cannot conclude that the actual noise levels from the operational activities of the Eastshore project will be lower than the predicted levels. Staff concludes that an increase of 6 dBA could potentially create a significant adverse noise impact at R1. Therefore, staff proposes Condition of Certification **NOISE-4** to require the project owner to implement feasible and appropriate mitigation measures to reduce the impacts of the project noise to less than significant at the most noise-sensitive receptors. This condition limits the noise due to the project operation alone to an average of 46 dBA at monitoring location R1. This, combined with the above ambient level of 44 dBA L_{90}, results in 48 dBA L_{90}, 4 dBA above the existing ambient level. This would prove barely noticeable, and is below the level of significance as defined above.

Examples of typical mitigation measures are erection of sound walls around the noisiest equipment, operating fewer engines simultaneously, and increasing exhaust stack and inlet air silencing. Staff believes these measures and other standard noise mitigation measures typically used throughout the industry can significantly reduce the project's noise impacts.

Because the Bank operates during the daytime, staff compares the project's noise impact to the daytime ambient noise level at this location. Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is therefore best represented by the average noise level, or L_{eq}. Thus, staff compares the project's noise level to the daytime ambient L_{eq} level at the Bank. Combining the average daytime ambient noise level of 62 dBA L_{eq} (**Noise Table 2**, above) with the project noise level of 70 dBA at the Bank results in 71 dBA L_{eq}, 9 dBA above the ambient. Staff considers this increase to create a potentially significant adverse noise impact at this location. As explained above, staff proposes Condition of Certification **NOISE-4** to ensure that the noise level due to the project operation alone would not exceed 60 dBA at this location. At this level, the increase in the ambient noise level would be no greater than 2 dBA, which is barely noticeable and represents a less than significant impact.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (EEC 2006a, AFC § 8.5.5.3.3). To ensure that tonal

noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

All water and gas pipes will be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and will be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of the Eastshore project would be carefully balanced in order to produce very low vibration levels throughout the life of the project. The applicant explains that the Wärtsilä engines in the Eastshore project are mounted on their foundations with spring packs to isolate engine vibration. In addition, engine generator piping will be connected to external piping through bellows. These features effectively isolate engine generator vibration from their foundations and surrounding equipment. The resulting vibration is typically less than 0.02 inches/second (EEC 2006a, AFC § 8.5.5.3.4). This level of vibration is below the intrusion level of 0.0984 inches per second, as defined by the California Department of Transportation (Caltrans 1976). As explained above, a peak particle velocity of approximately 0.002 inches/ second typically represents the threshold of perceptible vibration, while a peak particle velocity of 0.2 inches/second represents the threshold of architectural damage for conventional sensitive structures. The applicant maintains that ground-borne vibration from the Eastshore project would weaken so rapidly that it would be imperceptible at the site boundaries.

To guarantee their products, manufacturers must build them so that they are not susceptible to vibration levels that could potentially damage those products, or buyers would be very reluctant to purchase them. It would be very expensive and inefficient for a power plant owner to constantly repair and replace the damaged components of those products. Engine manufacturers have designed and built many similar machines in the past years that have not generated any perceptible vibrations at nearby receptors just a few hundred feet away. Staff has independently evaluated the project vibration impacts and concludes that isolating engine generator vibration from their foundations and surrounding equipment, as described above, would likely reduce ground-borne vibration from the Eastshore project to levels that would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows, objects on shelves, and the walls of lightweight structures. The project's chief source of airborne vibration would be the engines' exhaust. In a power plant like the Eastshore project, however, the exhaust must pass through selective catalytic reduction units, carbon monoxide catalysts, and stack silencers before reaching the atmosphere. These devices act as efficient mufflers. In addition, equipment will be enclosed within an acoustically engineered building. This combination of selective catalytic reduction units, carbon monoxide catalysts, stack silencers, and the building itself makes it highly unlikely that the Eastshore project would cause perceptible levels of airborne vibration.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (ECC 2006a, AFC § 8.5.5.3.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but do not need to provide as much detail as the discussion of impacts solely attributable to the project.

Calpine Corporation's proposed Russell City Energy Center (RCEC) is located 0.82 miles from the Eastshore project's closest residence (R1, labeled R2 in RCEC AFC) (EEC 2006a, AFC § 8.5.6). According to the RCEC AFC, RCEC's operational noise level at this location would be 44 dBA. When this is combined with the predicted level of 49 dBA from the Eastshore project (see above) at R1, it results in 50 dBA. Combining this with the existing measured nighttime ambient level of 44 dBA L_{90} (see **NOISE Table 2)** results in a cumulative impact level of 51 dBA L_{90}. This is 7 dBA above the ambient level at R1 and represents a potentially significant impact. As explained above (in **Operation Impacts and Mitigation**) staff proposes Condition of Certification **NOISE-4** that would ensure the Eastshore project's noise levels will create less than significant impacts at the most noise-sensitive receptors. This condition limits the noise level from the operation of the project alone to 46 dBA during the nighttime hours at R1. Combining this with the noise level form the RCEC and the ambient noise level at this location results in 49 dBA L_{90}, 5 dBA above the ambient. Staff considers the impact of an increase of up to 5 dBA to be less than significant.

Construction of the I-880 freeway improvement (approximately 1.25 miles from R1) and the RCEC (approximately 0.82 miles from R1) will not likely create significant noise impacts at R1, due to their distant locations to this receptor. Furthermore, shielding effects of intervening structures between these sites and the Eastshore project site will help reduce this impact.

Staff is not aware of any other projects which, when combined with the Eastshore project, would create direct cumulative noise impact in the project area.

With implementation of the following proposed conditions of certification, it would be unlikely that the Eastshore project, combined with other new noise producing developments, would produce significant cumulative noise impacts.

FACILITY CLOSURE

All operational noise from the project would cease when the Eastshore project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated -- that is, noisy work could be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

RESPONSES TO AGENCY AND PUBLIC COMMENTS

No agency comments in the area of **Noise and Vibration** have been received.

Public comments made on the PSA relative to **Noise and Vibration** are generally responded to in the body of the text of this section and summarized below.

RESPONSES TO PUBLIC COMMENTS

Members of the public submitted several comments regarding **Noise and Vibration** as described by the PSA (PUB 2007aj). Staff has reviewed those comments and incorporated appropriate revisions. The following text summarizes the staff's responses to those comments.

1. If the cooling fans for the Wärtsilä engines do not meet noise control standards, can the sound be mitigated by sound walls?

   Staff's Response: The radiator fans to be used in this project will be low-noise type fans. Typically, noise reduction is achieved by using low-speed fans, through the proper design of fan blade geometry and configuration, material type, and mounting and structural elements. These design considerations reduce both, air flow-induced and vibration-induced noise. Manufacturers typically design and build cooling fans to meet project specific noise requirements.

   After the installation of these radiators and the start of project operation, if the fans still prove to be too noisy, the project owner would be required to implement additional mitigation measures to comply with the requirements set forth in the staff's proposed Condition of Certification **NOISE-4** below. Also, to ensure that the noise from the cooling fans and the entire power plant would not create annoyance, staff proposes the following Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process requiring the project owner to resolve any problems caused by project noise. As required by Condition of Certification **NOISE-4**, when the project first attains a sustained output of 95 percent or higher of its rated capacity, a noise survey would be conducted to measure the combined power plant noise, which would include the cooling fan noise. Note that it is not possible to measure only the noise from the cooling fans while the rest of the power plant is shut off. If the results from the noise survey

indicate that the power plant average noise levels at the affected receptor sites exceed the acceptable values described in this condition, the project owner shall implement mitigation measures to reduce noise to a level of compliance with these limits.

As for the specific mitigation measures, as described in Condition of Certification **NOISE-4**, the project owner would provide the staff with a list of possible measures, if necessary. This list may include a sound wall, depending on the height of the radiators. Then, with the staff's approval, the project owner would implement the appropriate measure(s).

2. A health study will be forwarded to staff from a public member, and that person requests the health study be considered in the Final Staff Assessment (FSA).

   Staff's Response: Staff understands that the article referred to staff is found online at http://www.guardian.co.uk/science/2007/aug/23/sciencenews.uknews (PUB 2007al). Staff reviewed this article, entitled "Noise of modern life blamed for thousands of heart deaths". The article states that long-term exposure to traffic noise may account for 3 percent of deaths from coronary heart disease in Europe. The only measurable noise impacts from traffic activities related to the Eastshore project would occur during the construction period, as traffic noise impacts during operations would be minimal. As explained above, construction activities and therefore construction related traffic are temporary in nature and do not expose people to long-term high noise levels. Construction noise is temporary, because construction activities would occur neither around-the-clock nor for long periods. Staff proposes Condition of Certification **NOISE-6**, which requires that haul trucks and other engine-powered equipment be equipped with adequate mufflers, and that haul trucks be operated in accordance with posted speed limits. This condition also requires that the use of truck engine exhaust brake be limited to emergencies. Also, to ensure construction related noise does not cause annoyance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints related to construction noise.

   This article refers to the World Health Organization guidelines indicating that the guidelines' noise threshold for cardiovascular problems is chronic nighttime exposure of 50 decibels or above. As seen above, staff has concluded that the project's operational plus ambient noise level at R1 may reach 50 dBA L_{90}, 6 dBA above the ambient, and has proposed Conditions of Certification **NOISE-4**, which requires the project to reduce the predicted noise level of 49 dBA from the operation of the project alone to 46 dBA at this location. A level of 46 dBA, when combined with the nighttime ambient level of 44 dBA L_{90} at this location, results in 48 dBA L_{90}, below the above referenced threshold.

   Therefore, staff believes the construction and operation of the Eastshore project, if built and operated in conformance with the proposed conditions of certification below, would not cause significant adverse noise impacts at the project's most-sensitive receptors.

3. Where was the noise level measured? Was it taken at the fence line of the intervener or another area adjacent to the project property? Were the local LORS considered and is the project in compliance with them? Public feels a noise level of 55 dBA is unrealistic. How does the project expect to meet attainment with so many engines?

   Staff's Response: As seen above (in **Ambient Noise Monitoring**), the ambient noise measurements were taken at two different locations. One location was the front yard of the closest residence to the site, located at 2765 Depot Road, approximately 1,100 feet from the project site, referred to as R1. This location was monitored continuously from 5:00 p.m. on July 31 through 5:00 p.m. on August 1, 2006. The other location was the southern property boundary of the proposed project site adjacent to the Bank directly south of the site. This location was monitored continuously from 5:00 p.m. on July 31 through 5:00 p.m. on August 1, 2006.

   As described above in **Direct Impacts and Mitigation**, under **Assessment of Impacts and Discussion of Mitigation**, staff has evaluated the project's compliance with the applicable local noise LORS, the City of Hayward General Plan, at the nearest residences and the nearest commercial building (the Bank). Staff has also proposed conditions of certification to require the project to comply with the requirements of this LORS.

   This LORS states that the maximum acceptable exterior noise level in single-family residential areas is a day-night level (L_{dn}) of 55 dBA. Staff believes this is achievable at the closest residential receptors, near R1, approximately 1,100 feet away. According to Wärtsilä, the engine manufacturer, its standard power plant products are designed to meet international criteria on environmental noise and local noise LORS. All 14 engines will be enclosed in an acoustically-engineered main building and each engine will be equipped with an inlet air silencer and an exhaust stack silencer. The radiator fans will be of low-noise type (for further discussion, please see the staff's response to public comment 1 above). In light of these design considerations and the following proposed conditions of certification, staff believes the project will comply with the applicable noise LORS.

4. There is a concern that the construction sound level may be intrusive, as some noise will be produced during sleep time that may cause sleep interference.

   Staff's Response: Noisy construction activities which could create sleep interference will be limited to daytime hours, as required by the proposed Condition of Certification **NOISE-6**.

5. What is the maximum time the plant may run during those hours (nighttime)? Is there a use permit involved?

   Staff's Response: According to the AFC, the project will be permitted to operate up to 4,000 hours per year (46 percent of the time) (EEC 2006a, AFC §§ 2.2.2, 2.2.16). The applicant obtained an independent power market analysis to predict expected hours of operation over the 30 year design life of the facility. The analysis predicts

actual annual average operation of the plant to be 1,739 hours per year (EEC 2006a, AFC §§ 2.2.16, 2.4.1). Of course, actual operation will depend upon the actual PG&E system demand, and the ISO dispatch requirements. The prediction of 1,739 hours per year is equivalent to 20 percent of the time. Because this project will be an intermediate and peaking load facility, the project will likely operate during hot summer afternoons more often than at late night hours. Therefore, it is expected that nighttime operations will be limited.

The Energy Commission's Final Commission Decision will be the permit. The permit will require the project to comply with the applicable noise LORS through compliance with the following conditions of certification. Please see the staff's analysis of the project's nighttime noise levels for further discussion (in **Direct Impacts and Mitigation**, under **Assessment of Impacts and Discussion of Mitigation**).

6. There is a concern about all the engines and the vibration of those engines all running at the same time. What are the dimensions of a Wärtsilä engine?

   Staff's Response: As explained above, in **Vibration**, under **Operation Impacts and Mitigation**, these components would be balanced in order to produce very low vibration levels throughout the life of the project. The Wärtsilä engines are typically mounted on their foundations with spring packs to isolate engine vibration. In addition, engine generator piping will be connected to external piping through bellows. These features effectively isolate engine generator vibration from their foundations and surrounding equipment. The resulting vibration is typically less than 0.02 inches/second. This is below the intrusion level of 0.0984 inches/second, as defined by the California Department of Transportation (Caltrans 1976). As explained above, a peak particle velocity of approximately 0.002 inches/second typically represents the threshold of perceptible vibration, while a peak particle velocity of 0.2 inches/second represents the threshold of architectural damage for conventional sensitive structures. The ground-borne vibration from the Eastshore project is expected to weaken so rapidly that it would be imperceptible at the site boundaries.

   In a power plant like the Eastshore project, the exhaust must pass through selective catalytic reduction units, carbon monoxide catalysts, and stack silencers before reaching the atmosphere. These devices act as efficient mufflers. In addition, equipment will be enclosed within an acoustically- engineered building. This combination of selective catalytic reduction units, carbon monoxide catalysts, stack silencers, and the building itself makes it highly unlikely that the Eastshore project would cause perceptible levels of airborne vibration.

   According to Wärtsilä, the 20V34SG model engine chosen for the Eastshore project is 36 feet long, 10 feet wide, and 13 feet high.

7. The noise from the cooling fans needs to be addressed in the FSA.

   Staff's Response: Please see the staff's response to public comment 1 above.

8. There is a concern about an increase of 6 dBA in ambient noise level (PUB 2007al).

   Staff's Response: Please see the staff's response to public comment 2 and the staff's revised analysis in **Operation Impacts and Mitigation**, above.

9. There is a concern about an increase of 7 dBA in the ambient noise level resulting from the cumulative impact of the RCEC and Eastshore projects (PUB 2007al).

   Staff's Response: Please see the staff's revised analysis in **Operation Impacts and Mitigation** and in **Cumulative Impacts and Mitigation**, above.

10. No scientific support has been provided for the statement that the plant vibration will weaken to the threshold of imperceptibility before it reaches the plant boundaries (PUB 2007al).

    Staff's Response: Please see the staff's response to public comment 6 and the staff's revised analysis under **Operation Impacts and Mitigation**, in **Vibration**, above.

11. No analysis has been presented in regard to the noise impact at the neighboring offices, such at the Bank (PUB 2007al).

    Staff's Response: Staff has evaluated this impact at the closest office building, the Bank, and has revised this section accordingly. For the detailed analysis, please see the above discussion in **Direct Impacts and Mitigation**, under **Assessment of Impacts and Discussion of Mitigation**, the above staff's responses to public comments, and the following response to the comment from Fremont Bank.

Fremont Bank:

Fremont Bank submitted comments regarding **Noise and Vibration** as described by the PSA (PUB 2007ak). Staff has reviewed those comments and incorporated appropriate revisions. The following text summarizes the staff's response to those comments.

Fremont Bank is concerned about the project's noise impacts at the Bank (located at 25151 Clawiter Road in Hayward). This property is adjacent to the southern boundary of the Eastshore project site.

Staff's Response: Staff has included an analysis of the project's noise impacts during construction and operations at this location. Please see this analysis in **Assessment of Impacts and Discussion of Mitigation**.

CONCLUSIONS

Staff concludes that the Eastshore project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant direct or cumulative adverse noise impacts on people within the project area, including the minority population, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and the linear facilities, and Fremont Bank's Operations Center at 25151 Clawiter Road in Hayward, by mail or by 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 a 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 where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

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. The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is performed and complete.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone, during the four quietest consecutive hours of the nighttime, to exceed an average of 46 dBA measured at or near monitoring location R1 (2765 Depot Road). The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the exterior noise levels due to plant operation alone to exceed an hourly average of 60 dBA measured at the northern wall of the north building of the Fremont Bank's Operational Center (25151 Clawiter Road).

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first attains a sustained output of 95 percent or higher of its rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring location R1, or at a closer location acceptable to the CPM. This survey during the power plant's full-load operation shall also include the measurement of one-third octave band sound-pressure levels to ensure that no new pure-tone noise components have been caused by the project.

   The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, that is closer to the plant (for example, 400 feet from the plant boundary). This measured level will then be mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. During the period of this survey, the project owner shall conduct a short-term noise survey during the daytime hours, from 7 a.m. to 10 p.m., at or near the northern wall of the north building of the Fremont Bank's Operational Center, or at another location acceptable to the CPM, in order to measure the power plant's contribution to the exterior noise level at the Bank. This survey during the power plant's full-load operation shall also include the measurement of one-third octave band sound-pressure levels

to ensure that no new pure-tone noise components have been caused by the project.

C. If the results from the noise survey indicate that the power plant average noise levels at the affected receptor sites exceed the above values during the above specified time periods, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

D. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate those pure tones.

Verification: The survey shall take place within 30 days (or when otherwise approved by the CPM) when the project first attains a sustained output of 95 percent or higher of its rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report 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 those measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's attainment of a sustained output of 95 percent or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any 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 to be employed in order to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below, unless a special permit has been issued by the City of Hayward:

Any day except Sundays and holidays:	7 a.m. to 7 p.m.
Sundays and holidays:	10 a.m. to 6 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: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Eastshore Energy Center Project
(06-AFC-6)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

Caltrans 1976 – Survey of Earth-borne Vibrations due to Highway Construction and Highway Traffic. Final Report. April 1976.

CH2MHill 2007h – CH2MHill/ D. Stein. Applicant's Email Response to Staff's Inquiry about the Noise Impacts of the Eastshore Energy Center at the Fremont Bank's Operational Center. 09/22/2007 Rec'd 09/22/2007.

COH 2002 – City of Hayward. Guidelines for the preparation and content of noise element of general plan. Prepared by the California State Office of Noise Control.

EEC 2006a – Eastshore Energy Center, LLC/ G. Trewitt (tn 37923) Application for certification for the Eastshore Energy Center. 09/15/2006 rec'd 09/22/2006.

PUB 2007aj – Public/ Members of the Public (tn 42332) Public comments on the Preliminary Staff Assessment for the Eastshore Energy Center. Rec'd 09/20/2007.

PUB 2007ak – Public/ Members of the Public. Comments from Fremont Bank on the Preliminary Staff Assessment for the Eastshore Energy Center. Rec'd 09/24/2007.

PUB 2007al – Public/ Members of the Public. Comments from Michael Toth on the Preliminary Staff Assessment for the Eastshore Energy Center. 09/16/2007. Rec'd 09/18/2007.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

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

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **NOISE 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_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study).
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.
Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.	

NOISE Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980			

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

NOISE Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

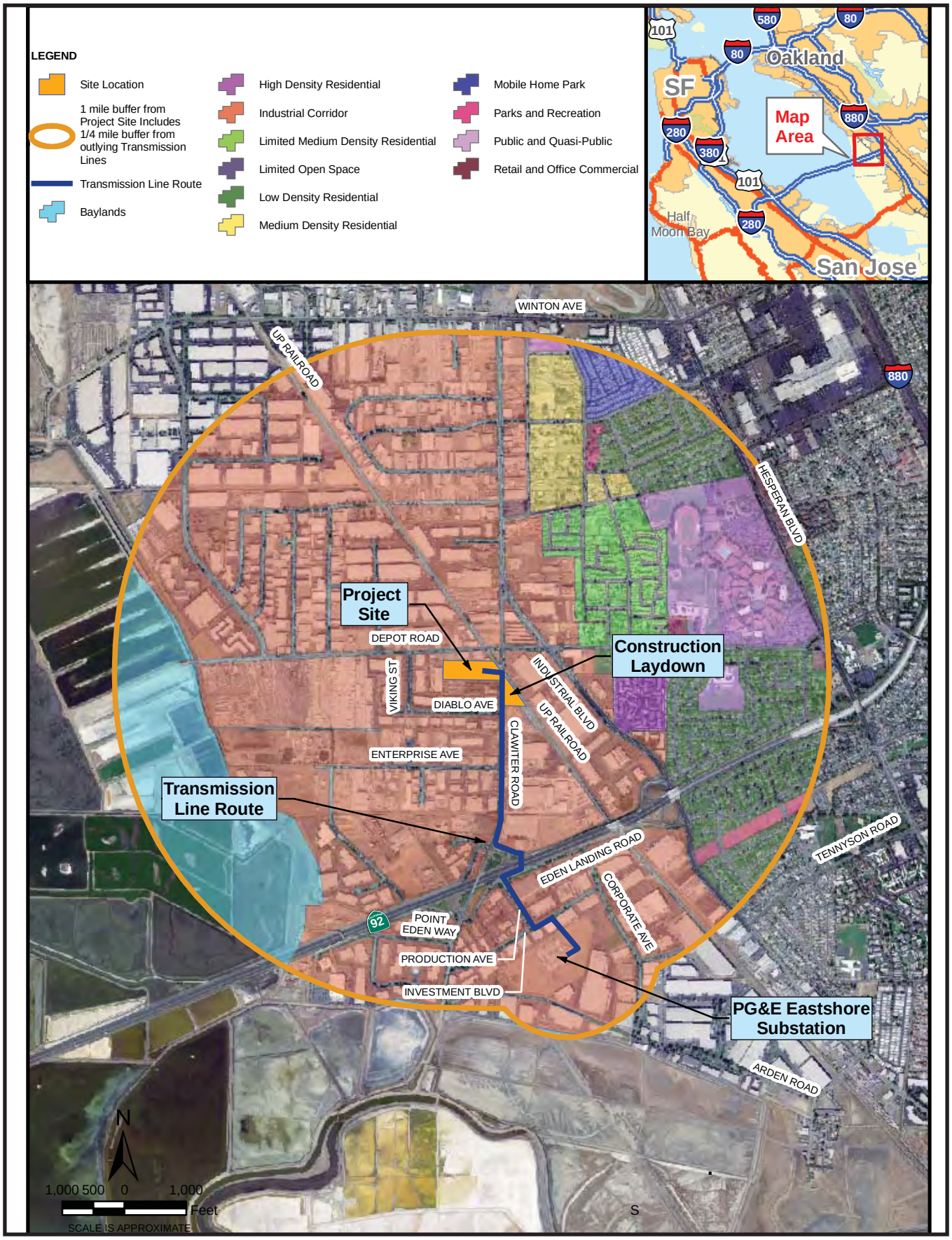
OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

NOISE Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

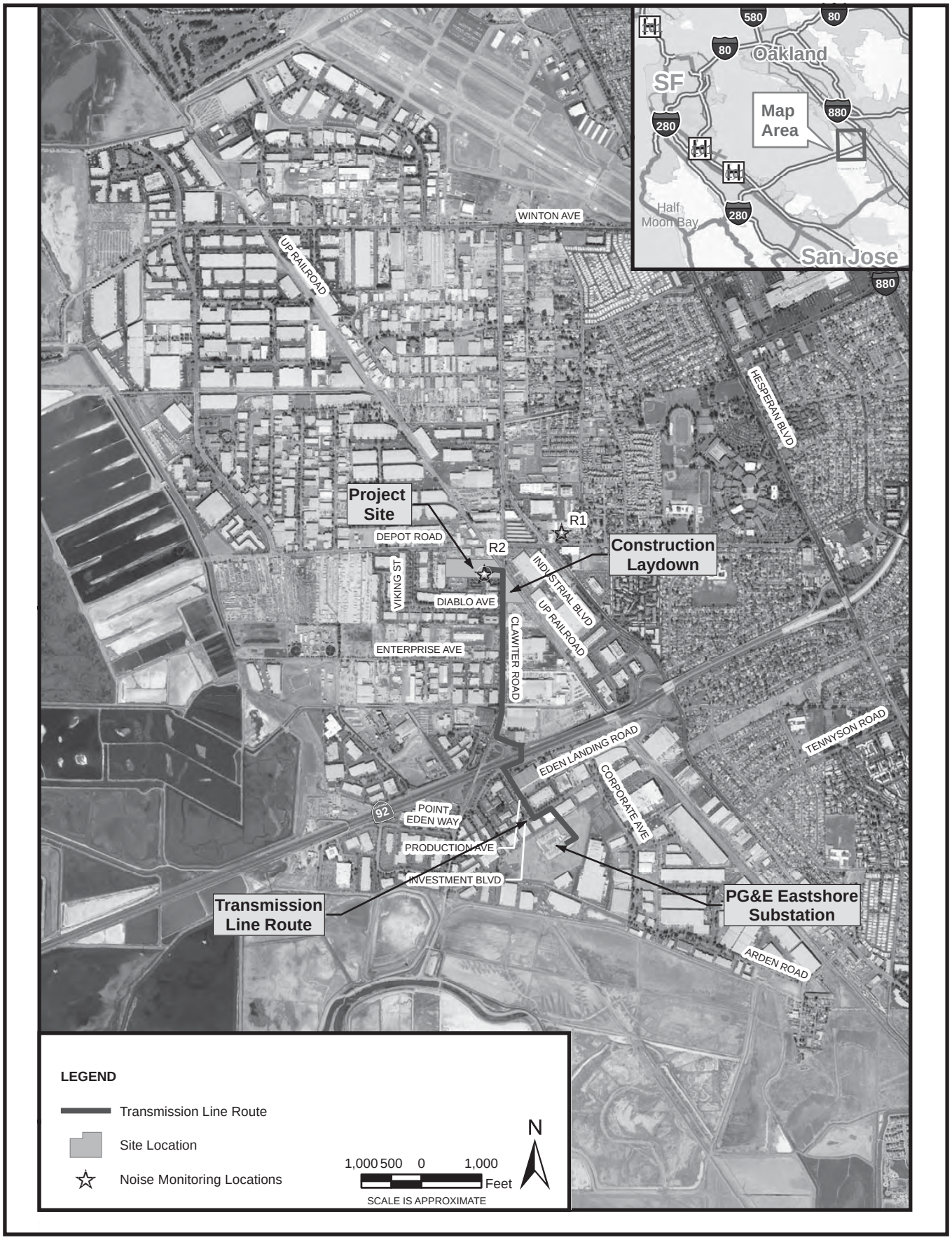
Source: 29 C.F.R. § 1910.

NOISE AND VIBRATION - FIGURE 1
Eastshore Energy Center - Land Use Desiginations



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 8.4-1

NOISE AND VIBRATION - FIGURE 2
Eastshore Energy Center - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 8.5-1

PUBLIC HEALTH

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Eastshore project (Eastshore) and does not expect there would be any significant adverse cancer, or short or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed Eastshore project was based on a health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from Eastshore would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if toxic emissions from the proposed Eastshore project would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Staff addresses potential impacts of regulated or criteria air pollutants, including small particulate matter that have been linked to causing or exacerbating respiratory diseases, in the **Air Quality** section of this FSA. Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Project releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination. Existing air quality and public health concerns are described in subsequent sections.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

PUBLIC HEALTH Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.
Local	
Bay Area Air Quality Management District Regulation 2, Rule 2	This rule requires that Best Available Control Technology for air toxics be applied to the facility for major sources of hazardous air pollutants.
Bay Area Air Quality Management District Regulation 2, Rule 5	This rule requires a risk assessment or risk screening analysis to be performed for new or modified facilities that emit one or more toxic air contaminants.

SITE AND VICINITY DESCRIPTION

Land uses in the vicinity of the proposed project are predominantly light industrial, with commercial office space immediately to the south (EEC 2006a Section 2.1.1). Currently, land at the proposed site is zoned for industrial use (EEC 2006a Section 8.6.1.3). The natural gas pipeline proposed to be constructed for this project will go under Clawiter Road and the existing Union Pacific Railroad right-of-way and connect to an existing PG&E gas pipeline located along the east side of Clawiter Road.

The nearest residential area lies approximately 1,100 feet from the site entrance, directly east of the site. There are seven sensitive receptors within one mile of the project, including schools and a convalescent hospital. Two hospitals are located

approximately 1.6 miles from the site (EEC 2006a, Appendix 8.1D). As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts.

The topography of the site is essentially flat (about 23 feet above sea level), as is the land to the north, west, and south of the site. Elevations to the east tend to increase gradually as you move towards the East Bay foothills.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

Mild summers with minimal precipitation and mildly windy and rainy winters characterize the climate of the Bay Area Region (EEC 2006a Section 8.1.3.3.1). The climate at the project site is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, a semi-permanent, subtropical high-pressure system located off the west coast of the United States. The size and strength of the Pacific high is at a maximum during the summer, when it is at its northernmost position, and results in strong northwesterly airflow and negligible precipitation. During this period, inversions become strong, winds are light, and the pollution potential is high. The Pacific high's influence weakens during the fall and winter when it moves southwestward, which allows storms from the Gulf of Alaska to reach northern California. About 77% of the region's annual rainfall occurs between December and March. During the winter, inversions are weak, winds often moderate, and the potential for air pollution is low.

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

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). By examining average toxic concentration levels from representative air monitoring sites in the project vicinity with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States from all causes is about 1 in 3, or 333,000 in one million. For the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1%, about 1 in 4.

The criteria pollutant air quality monitoring sites nearest to the proposed Eastshore site located in the East Bay area include Fremont, Hayward, San Leandro, and Richmond

(EEC 2006a Section 8.1.3.4.8). Toxic Air Contaminant (TAC) monitoring stations located in the East Bay include San Leandro, Oakland (3 locations), Fremont, Richmond, and San Pablo. Staff believes that the TAC monitoring stations in Oakland, San Leandro, and Fremont adequately characterize the airborne concentrations of TACs that currently exist in the Hayward area.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years. For example, in the Bay Area, cancer risk was 342 in one million based on 1992 data, 315 in one million based on 1994 data, and 303 in one million based on 1995 data. In 2002, the most recent year for which data is available, the average inhalation cancer risk decreased to 162 in one million (BAAQMD 2004, p. 12). In comparison, staff has estimated the theoretical maximum cancer risk as a result of all emissions from the proposed Eastshore project to be 3.7 in one million, a value 2.2% of the existing background cancer risk.

EXISTING PUBLIC HEALTH CONCERNS

Asthma

Staff has reviewed data on asthma mortality, prevalence, and hospitalization rates reported in the United States, California, Bay Area Counties, Alameda County, and the City of Hayward. Staff's report on this comparison can be found in **Public Health Appendix A** and a discussion of the lack of project impacts on asthma in the community can be found in subsequent sections of this FSA.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The Public Health section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

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

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

- Identify the types and amounts of hazardous substances that Eastshore could emit to the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;

- Estimate amounts of pollutants that people could be exposed through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case risks, and then using those conditions in the study. Such conditions include:

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

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from twelve to one hundred percent of a lifetime, or from eight to seventy years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called “reference exposure levels” or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors”, and established by the California Office of Environmental Health Hazard Assessment - OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

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

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

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index.” A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

Cancer Risk

Staff relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations, section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the BAAQMD Board of Directors pursuant to Health and Safety Code § 44362(b), which requires notification of nearby residents when an air district determines that there is a significant health risk from a facility. In addition, BAAQMD’s Toxic Air Contaminant Regulation (Regulation 2, Rule 5, adopted June 15, 2005) states that a

project with an incremental cancer risk of between one and ten in one million is acceptable if best available control technology has been applied to reduce risk (BAAQMD 2005). In general, BAAQMD would not approve a project with a cancer risk exceeding ten in one million (regulations 2-5-301 and 2-5-302).

As noted earlier, the initial risk analysis for a project is typically performed at a screening level which is designed to overstate actual risks so that staff is confident that that risk and hazard are not underestimated. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants and any minority or low income populations that are likely to be disproportionately affected by impacts (because these populations often have a greater incidence of pre-existing medical conditions). In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set by OEHHA or U.S. EPA to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances occur during demolition of existing structures, facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances. Staff believes that adherence to current ordinances requiring identification and removal of asbestos containing materials (ACM) and removal of regulated building materials prior to demolition, site soils and groundwater characterization and remediation, and staff's proposed Conditions of Certification as described in the **Waste Management** and **Soil and Water** sections of this document will be adequate to address any soil or groundwater contamination that exists on this site.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of

spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

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

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of Eastshore is anticipated to take place over a period of 18 months, including site preparation. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

AFC Appendix 8.E presents diesel exhaust emissions from engines and fugitive dust from construction activities. The applicant estimated worst-case hourly dust emissions of 3.8 lb/day of particulate matter less than 10 microns (PM10) and 0.8 lb/day of particulate matter less than 2.5 microns (PM2.5). Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. The applicant's modeling of emissions of diesel particulate matter from construction equipment found that the cancer risk was estimates at 6.7 in one million, below the level of significance (10 in one million)(EEC 2006a, Section 8.6.3.2). The Hazard Index (0.3) was likewise determined to be below the level of significance (1.0). When construction activities including impacts of fugitive dust over a 12-month period were estimated by the applicant, they predicted an annual average concentration of 1.1 $\mu g/m^3$ of PM10 and 0.6 $\mu g/m^3$ PM2.5 at any location (EEC 2006a, Table 8.1E-2). Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM10 as well as PM2.5 concentrations. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90% reduction of fugitive dust emissions.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends the use of ultra

low-sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92%. Such filters will reduce diesel emissions during construction and further reduce the impacts associated with diesel exhaust. (See Condition of Certification **AQ-SC5** for staff's proposal to control particulate matter.)

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed Eastshore site include fourteen (14) lean-burn natural gas-fired internal combustion engines and one ARB diesel fuel oil-fired emergency ("black start") generator.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 8.1D-1 of the Application for Certification (AFC) lists non-criteria pollutants and their emission factors that may be emitted from the Eastshore engines as combustion byproducts. Table 8.1D-2 lists the black start diesel engine toxic air pollutant emission rates. Emission factors are from the California Air Toxics Emission Factors (CATEF II) database. Table 8.6-4 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include RELs, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health Table 2** lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects. In this case, stack emissions from the 14 Wartsila engines have not been measured by a "source test" and thus staff uses emission factors from similar engines tested and reported on the California Air Resources Board's data base called CATEF (California Toxic Emission Factors). This data base is routinely used by staff and others in California when source test data is not available. The ARB considers the use of these factors to be a reliable source of emission factors. Staff agrees with this approach and has allowed applicants to use CATEF in health risk assessments for power plant siting cases since the CATEF data base was established. According to ARB, not all reported emission factors are included in the data base and that over half of the tests collected

were eliminated and not used in emission factor development. Staff also uses the CATEF data base in its health risk assessment. A more detailed discussion of the CATEF data base and a comparison with U.S. EPA emission factors (referred to as AP-42 emission factors) can be found in **Public Health Appendix B**.

PUBLIC HEALTH Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions*

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium VI		✔	✔	✔	
Copper				✔	✔
Diesel Exhaust			✔	✔	
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔		✔		
Mercury		✔		✔	✔
Naphthalene		✔	✔	✔	
Nickel		✔	✔	✔	✔
Polycyclic Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

*Source:OEHHA 2003 Appendix L

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the project, including combustion and non-combustion emissions, resulted in a maximum acute hazard index of 0.66 and a maximum chronic hazard index of 0.23. The locations of the maximum acute and chronic hazards are shown in Figure 8.1C-1 AFC. As **Public Health Table 3** shows, both acute and chronic hazard indices are under the significance level of 1.0, indicating that no short- or long-term adverse health effects are expected.

PUBLIC HEALTH Table 3
Operation Hazard/Risk at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.66	1.0	No
Chronic Noncancer	0.23	1.0	No
Individual Cancer	8.5 in one million	10 in one million	No

Source: EEC 2006a Table 8.6-6

As shown in **Public Health Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 8.5 in one million at the location of maximum impact, which in this case is located just beyond the facility eastern fenceline on Clawiter Road.

Staff conducted an independent quantitative evaluation of the risk assessment results that the applicant presented in the "Eastshore Energy Center (06-AFC-06) Data Response Set 1A" (CH2MHill 2007a) and in the Application for Certification (EEC 2006a). Staff also used the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP model). The HARP transaction file and the five-year meteorological data file for Union City used in this analysis were provided by the applicant.

Staff's quantitative analysis of facility operations included the following:

- Stack parameters, building parameters, emissions and Universal Transverse Mercator (UTM) locations of sources were provided by the applicant in the HARP transaction file.
- Emissions from the 14 lean burn gas-fired engine exhaust stacks and the emergency diesel generator were included in the analysis.
- Used a coarse receptor grid to 2000 meter (m) in all directions at 50 m increments.
- Exposure pathways assessed include inhalation, dermal absorption, soil ingestion and mother's milk.

For cancer risk calculations using the HARP model, staff used the "Derived (Adjusted) Method". For chronic noncancer hazard calculations, staff used the "Derived (OEHHA)

Method". Both methods are suggested by OEHHA. Comparison of the results obtained by staff with the applicant's results in the AFC is presented in **Public Health Table 4**.

PUBLIC HEALTH Table 4
Applicant's and Staff Results: Eastshore Energy Center

	Maximally Impacted Receptor		
	AFC	**Staff**	**Applicable Significance Threshold**
Cancer Risk	8.5 in one million	3.7 in one million	<= 10 in a million with T-BACT
Chronic HI	0.23	0.10	1.0
Acute HI	0.66	0.32	1.0

(HI = Hazard Index)
(T-BACT = Best Available Control Technology for control of toxic emissions.)

Staff cannot explain the difference in the estimates of cancer risk calculated by the applicant and by staff. However, since both estimates are less than the level of significance, this difference is not substantive.

Public Health Figure 1 presents a diagram of the facility fenceline, buildings and stacks. **Public Health Figures 2, 3, and 4** present cancer risk, chronic hazard and acute hazard isopleths and indicate the location of the maximally impacted receptor from staff's HARP modeling. The point of maximum cancer risk (3.7 in a million) and chronic hazard index (0.10) is located several yards east of Clawiter Road in a parking lot. The maximum acute hazard index (0.32) is located a few yards to the north of the facility along the south side of Depot Road. Construction risks due to emissions of diesel particulate matter were also modeled by Staff by using the HARP model and standard risk assessment algorithms. Results obtained are compared to risks presented in the AFC in **Public Health Table 5**. All risks are below applicable significance thresholds.

Staff also conducted an assessment using different sets of emissions factors from the CATEF data base and with different assumptions on the effectiveness of the oxidative catalyst. Both the applicant and staff in their original assessments used the average emission factors from the CATEF data base and assumed that the oxidative catalyst would remove 40% of the Toxic Air Contaminants from the stack emissions, a conservative underestimation of the efficiency of the air pollution control devices. However, due to concerns raised by the public at a staff workshop, staff also assessed the health risks using the maximum values found in the CATEF data base but with credit for pollution control efficiency and also using mean values from CATEF but without any credit for pollution controls. Both these scenarios are unrealistic in staff's view - cancer risk should be based on average emissions over a long period of time and not maximum emissions over a short period and it is unreasonable to assume that no catalyst is present - but nevertheless, the risk assessment shows that the risks under these scenarios are not significant. The results are summarized in **Public Health Table 6.**

PUBLIC HEALTH Table 5
Construction risks due to diesel particulate matter

	AFC	Staff[1]	Staff[2]
Maximally Impacted Off-site Resident			
Cancer Risk	0.6 in a million	4.1 in a million	4.2 in a million
Chronic HI	0.5	0.3	0.3
Maximally Impacted Off-site Worker			
Cancer Risk	6.7 in a million	2.0 in a million	4.6 in a million
Chronic HI	-	-	-

[1] Risk determined using HARP model and adjusted for residential exposure rate (1.5 years exposure duration for 12 hours/day, 350 days/year).

[2] Risk determined using standard risk assessment algorithms.

PUBLIC HEALTH Table 6
Risk and Hazard Under Different Assumptions

	Mean CATEF w/ 40% Reduction	Mean CATEF no reduction	Max CATEF w/40% reduction
Cancer Risk	3.7 in one million	6.1 in one million	7.8 in one million
Chronic HI	0.1	0.17	0.37
Acute HI	0.33	0.53	0.93

Finally, staff points out that the applicant will be required to conduct actual emissions testing once the power plant begins commercial operations. Staff proposes Condition of Certification **PUBLIC HEALTH-1** to require source testing and to prepare a human health risk assessment based upon this testing. The results of the HRA must demonstrate that the risk is below the level of significance and that no noncancer hazard exists or the power plant would be required to operate at a reduced level until the risk is below the level of significance.

In conclusion, staff conducted an independent assessment of the risks and hazards due to emissions from the Eastshore project. Facility data and local meteorology were provided by the applicant. Modeling was conducted using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP), which was also used by the applicant. Staff calculated values for cancer risk, chronic hazard and acute hazard under several different scenarios to address the uncertainty in the emission factors of toxic air contaminants. Staff's analysis shows that, while slightly different from the applicant's, Eastshore emissions would not present a significant cancer risk to any member of the public, including low income and minority populations, and that noncancer hazards would not be caused by facility emissions.

Project Impacts on Background Asthma

A number of community members expressed concern about the incidence of asthma in the Hayward area and the effect of the project on asthma. In our efforts to respond to this concern, staff gathered a significant amount of data about the incidence of asthma in the project area. This data does not indicate that there are any unusual circumstances with respect to asthma incidence. In addition, staff's review of the scientific literature supports its finding that the emissions from this project will not create any significant adverse health impact. Nonetheless, we include the results of our data gathering efforts as **Public Health Appendix A** in an effort to provide as much information as possible to members of the public, even when that information is not needed to support the staff's conclusion.

Staff believes that asthma has emerged as a major public health problem in this country over the last 20 years and asthma rates among children have reached epidemic proportions in this state and throughout the entire United States. There is not one single cause of asthma – theories of causation include lifestyle factors, genetics, and environmental exposures – and studies attempting to identify specific environmental exposures associated with the development of asthma have not produced a unifying theory to explain the asthma epidemic. It is well documented that outdoor environmental exposures to criteria pollutants such as ozone, particulate matter (PM), sulfur dioxide and nitrogen oxides exacerbate asthma and that ozone can also cause asthma. A recent study (McConnell 2002) that investigated the relationship between newly-diagnosed asthma in children and air pollutants found that exposure to pollutants other than ozone – including PM10 and PM2.5 – had no impact on asthma causation. It is therefore unclear whether criteria pollutants other than ozone also cause asthma. The California Air Resources Board (CARB), in an exhaustive compilation of the available scientific studies, summarized over eighteen studies assessing the ability of PM - fine and coarse - to exacerbate asthma (CARB 2002). CARB found that “evidence for a fairly consistent (but not universal) effect of PM10 and PM2.5 has emerged over the last several years” but PM10 and PM2.5 causation of asthma has not been proved. As recent as 2006, CARB has stated that “the role air pollution plays in initiating asthma is still under investigation and may involve a very complex set of interactions between indoor and outdoor environmental conditions and genetic susceptibility.” CARB has, however, launched additional studies that will focus on the role of particulate matter pollution on asthma.

There are only a few studies available in the scientific literature that have attempted to link a specific stationary source (such as a power plant) to either the onset or exacerbation of asthma. The McConnell (2002) study mentioned above concluded that acute exposure to ozone and other outdoor air pollutants exacerbates asthma but combustion-related air pollution (from all combustion sources in the air basin) was not found to be associated with asthma. It is interesting to note that air pollution levels in many regions of the United States -- including the San Francisco Bay Area and Hayward -- are lower than they were in the past yet asthma prevalence has risen substantially over the past 20 years.

It is evident that further research is needed to definitively link emissions from gas-fired power plants as a cause or exacerbation of asthma. However, in comparison to other

sources, natural gas-fired power plants such as the proposed Eastshore project would produce limited amounts of pollutants capable of causing or exacerbating asthma and thus should be considered minor sources. Given the emissions controls and offsets required at the Eastshore project, staff believes that this project would not create any significant public health impact. Although staff agrees that the pollutants emitted from gas-fired power plants do indeed add incrementally to the risk of asthma in our population, the available scientific evidence supports staff's determination that this incremental addition to the risk is insignificant. Therefore, staff concludes that the Eastshore project would have an insignificant impact on existing asthma rates in the area surrounding the proposed power plant.

CUMULATIVE IMPACTS AND MITIGATION

The maximum cancer risk for emissions from Eastshore (calculated by staff) is 3.7 in one million at a location east of the facility a few yards east of Clawiter Road. The maximum impact location occurs where pollutant concentrations from Eastshore would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions and thus overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by Eastshore to be either individually or cumulatively significant.

However, to further assess potential cumulative impacts, a detailed public health cumulative risk assessment was conducted for emissions of toxic air contaminants from both the proposed Eastshore facility and the proposed Russell City Energy Center (RCEC), which is located approximately 3,280 feet to the west of the Eastshore site. This assessment was also conducted using the HARP model. HARP modeling of the RCEC had been conducted previously by staff. Data for RCEC was obtained from the "Russell City Energy Center (01-AFC-07) Amendment 1" report and included project-specific building parameters and project-specific stack parameters/emissions for two turbine/HRSGs, 9 cooling tower cells and the fire pump engine. The emission rates used were based on the scenario of annual averaging for normal operating conditions. For the modeling, the receptor grid was set to 1.2 miles in all directions at 164 foot increments. The cumulative analysis included 27 sources from the two facilities.

Results of the cumulative analysis conducted by staff are presented in **Public Health Table 7**. **Public Health Figure 5** presents a map of the two facilities. **Public Health Figures 6, 7, and 8** present cancer risk, chronic hazard and acute hazard isopleths and indicate the location of the maximally impacted receptor for each.

Based on the results of this cumulative analysis, the risk of cancer due to emissions from both the proposed Eastshore power plant and the proposed Russell City power plant would be well below the level of significance. The cumulative chronic and acute hazards would also be insignificant, although the estimated location of the combined impacts would be different than the locations due to emissions from the Eastshore

facility alone. Nevertheless, all impacts at all receptors, including sensitive receptors such as schools, would be below the level of significant impact.

PUBLIC HEALTH Table 7
Cumulative Risks: Eastshore Energy Center and Russell City Energy Center

EEC & RCEC	***Maximally Impacted Receptor***		
	Eastshore only (AFC)	**Eastshore only (Staff)**	**Cumulative (Staff)**
Cancer Risk	8.5 in a million	3.7 in a million	3.9 in a million
Chronic HI	0.23	0.10	0.11
Acute HI	0.66	0.33	0.40

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There were no agency comments received on Public Health issues. There were over 1,500 comments received from the public on this topic.

The vast majority of comments received from the public (both verbally at staff workshops and in letters to the Commission) concerned public health. The community is concerned about the emissions of both criteria pollutants (SOx, NOx, CO, and PM2.5) and Toxic Air Contaminants from the proposed power plant. The public is concerned about the potential for project emissions to cause or exacerbate asthma, whether emissions will cause cancer, and if a general decrease in air quality will result in adverse health impacts. These concerns are addressed in sections of this FSA and in the **Air Quality** section. One of the commenters (Mr. Michael Toth) raised issues about the emission factors database and the potential for PM2.5 emitted from the power plant stacks to cause cancer. His first issue is addressed in depth in this FSA and in Appendix B of this Public Health section. His second issue is addressed here.

There is no doubt that particulate matter inhaled is deleterious to humans and animals. While the larger (greater than 10 microns in diameter) particles do not reach the deep recesses of the lungs and thus can be efficiently removed by the body's defense mechanisms, the small particles (PM10 or less) and in particular the very small particles (PM2.5 or less) do reach the deep recesses and can remain there to cause injury. Numerous articles have demonstrated that PM of this size can cause significant cardiopulmonary morbidity and mortality depending, of course, on the airborne concentration and the duration of human exposure to that concentration. The California Environmental Protection Agency (Cal/EPA) has even recognized that PM from a certain source – diesel engines – can cause cancer in humans and has calculated a cancer potency factor for use in health risk assessments. This staff assessment conducts such an assessment for diesel PM exhaust during the construction phase of this project when diesel construction equipment would be operating. Mr. Toth has raised the issue of the carcinogenicity of PM10 and PM2.5 emitted from the stacks during operations and asked why this was not included in the human health risk assessments conducted by the applicant and by staff. He cites an article published in the Journal of the American Medical Association by Pope et al as documenting the basis of his claim that PM2.5 is carcinogenic. The short answer to his question is that both the staff and

the applicant have included the carcinogenic potential of PM emitted from the stack during operations in the health risk assessments.

Both PM10 and PM2.5 are highly heterogeneous and vary by location, sources, time and space. Emissions of PM2.5 stay in the atmosphere for long periods of time (weeks to months) and are removed mostly by precipitation events (rain). Because of the heterogeneity and wide variations in sources and airborne concentrations, it is very difficult to make definitive statements about PM10 and PM2.5 based on toxicological testing. The article by Pope et al is one of several epidemiological studies that suggest long-term exposure to particulate matter is associated with lung cancer. Research articles by Beeson (1998), Dockery (1993), Laden (2006), and Naess (2007) all support this association. However, it must be pointed out that all these studies are epidemiological studies that attempt to assess an association between ambient (background) airborne concentrations of PM2.5 from all sources and cancer incidence rates. And while these types of studies are fraught with uncertainty and cannot ascribe the risk of cancer to any specific type or source of PM, staff does agree that an association has been demonstrated. However, the sources of ambient PM2.5 are many and include combustion sources and non-combustion sources, such as diesel PM (a substance known to the State of California to cause cancer), re-entrainment of particles deposited on the roads and other surfaces, inorganic salts like ammonia nitrate and sulfates, and of course, particles emitted from various industrial sources, including natural gas fired power plants. The epidemiological evidence is not strong enough or specific enough for either the U.S. EPA or Cal/EPA to calculate a cancer potency factor for types of PM other than diesel exhaust. Thus, despite the causal relationship demonstrated between PM2.5 and cancer incidence, neither Cal/EPA nor the U.S. EPA has declared PM2.5 to be a probable or likely human carcinogen nor have these agencies required that they be assessed as carcinogens in a human health risk assessment. Therefore, staff cannot directly assess the carcinogenicity of the project's PM2.5 emissions.

More importantly, the health risk assessments conducted by the applicant and by staff do account for the potential carcinogenicity of PM emitted from the stacks because the actual carcinogenic substances likely responsible for the association between PM2.5 and cancer incidence are already addressed in the staff's health risk assessment. Staff believes that the carcinogenicity of PM2.5 is most likely due to the carcinogenic substances that are adsorbed to the surface of the carbonaceous particulate matter. The carcinogenic substances adsorbed to the PM2.5 and emitted from combustion sources and which most likely cause the increased cancer incidence seen in the above-mentioned studies are PAHs (polycyclic aromatic hydrocarbons). This position is also supported by the Beeson (1998) study mentioned above. These substances are well-documented to cause cancer and are formed by all combustion sources including cigarettes, grilled meats, automobile exhaust, fireplaces, and power plants. Emissions of these substances are included in the human health risk assessment conducted by both the applicant and staff and thus the carcinogenicity of the PM emitted by the project is quantitatively assessed and demonstrated to be below the level of significance.

Furthermore, as described in the **Air Quality** section of this FSA, staff is requiring the offset of PM emitted from the proposed power plant. Some of these offsets will be local,

such as elimination of woodstoves and wood-burning fire places, and others will be regional. But since the airborne concentration in the neighborhood around the Eastshore site is impacted by regional PM emissions, both local and regional offsets will also benefit the area around the power plant site.

Finally, to ensure that the risks and hazards due to emissions from the proposed power plant are indeed below the level of significance, staff has proposed a Condition of Certification that describes the source testing and risk assessment the project owner must conduct should this power plant be licensed by the Commission, built, and operated. This source testing must include measurements of both the gaseous PAHs and the particulate-bound PAHs. This requirement is echoed by the Final Determination of Compliance (FDOC) issued by the BAAQMD and staff has consulted extensively with the BAAQMD on this matter.

Agency and public comments made on the PSA relative to **Public Health** are generally responded to in the body of the text of this section and summarized below.

AGENCY COMMENTS ON THE PSA

No agency comments were received on the PSA relative to **Public Health** issues.

PUBLIC COMMENTS ON THE PSA

Several public comments were made during the PSA workshop and several specific comments were filed in writing to Energy Commission following the PSA workshop. They include comments by Mr. Toth concerning acrolein emissions, the potential carcinogenicity of PM2.5, and his request that staff conduct major research projects.

Staff wishes to clarify the purpose and methodology of a regulatory health risk assessment. A health risk assessment (HRA) for the purposes of licensing or permitting a stationary source of toxic air contaminants (TACs) is a procedure that is used to ensure that the risk or hazard is not underestimated. If a facility emits TACs at levels that do not result in a significant risk at the Point of Maximum Impact (PMI) using this methodology, the regulatory agency is very confident that the actual risk and hazard are below the levels predicted by the HRA. Many factors go into a HRA and were discussed in this staff assessment under the heading **Method and Threshold for Determining Significance.** These include:

1. The identity and amount of TACs emitted from the source.

2. Toxicity values used and the safety factors applied to those toxicity factors.

3. Air dispersion modeling.

4. Meteorological data.

5. Exposure factors.

6. Use of the predicted risk and hazard at the Point of Maximum Impact (PMI) to determine regulatory compliance.

Emission factors are but one of the many variables that go into a HRA. Air dispersion modeling is another component of a HRA and the EPA-approved models use meteorological data that assumes atmospheric conditions such as inversions and low wind speed that result in poor mixing and poor dispersion of TACs emitted from the stack, thus resulting in the highest predicted airborne levels. Exposure factors such as the duration and frequency that a person would be in the area assume all people would be exposed every minute of every day for 70 years at the Point of Maximum Impact.

Regulatory agencies use this methodology to estimate the risk and hazard and when using this methodology consistently state-wide, to ensure that all sources can be compared on an equal basis. Yet, it is recognized that if the HRA shows a hazard above the level of significance (Hazard Index of 1.0) it does not indicate that a hazard exists. If this threshold level is exceeded, Cal-EPA guidance specifically states that a more refined approach can be used to more accurately estimate risk.

In specifically the hazard posed by the emissions of acrolein, staff points to the guidance from Cal-EPA Office of Environmental Health hazard Assessment (OEHHA). According to OEHHA guidance, *"It should be noted that exceeding the acute or chronic REL does not necessarily indicate that an adverse health impact will occur. However, levels of exposure above the REL have an increasing but undefined probability of resulting in an adverse health impact, particularly in sensitive individuals (e.g., depending upon the toxicant, the very young, the elderly, pregnant women, and those with acute or chronic illnesses). The significance of exceeding the REL is dependant on the seriousness of the health endpoint, the strength and interpretation of the health studies, the magnitude of combined safety factors, and other considerations."* (OEHHA 2003).

Staff has considered the argument and statistical analysis offered by Mr. Toth. Staff agrees with Mr. Toth that the best data to use in a HRA are the emission factors from the Wartsila engines as determined by a source test on those engines. However, limited source test data for these engines was provided as confidential information by Wartsila; although the exact results cannot be released, staff can assure the public that the emission levels of the contaminants tested are less than or equal to the emissions used in the HRA. Staff used data from the CATEF database of similar but not the same engines, a practice routinely used in California for regulatory purposes and supported by the Air Resources Board and local air districts. Staff renders no opinion on whether one data set is significantly better than another data set as that is left for the staff of the ARB to decide and they have indicated that they are comfortable with the CATEF database.

Consistent with OEHHA guidelines, staff has also examined the basis of the acute REL for acrolein and found that OEHHA based the acute REL on a single study of eye irritation in 36 volunteer adults whose eyes were exposed to acrolein in the air for 5 minutes. The toxicological endpoint was not a serious health impact but rather the subjective report of mild eye irritation. In other words, no objective medical findings were made in this study; only the subjective opinion of 36 volunteers as to what constituted mild irritation of the eyes was considered. OEHHA then applied a safety factor of 60 times less to the lowest observable adverse effect level (LOAEL) to account for the uncertainties in the results. This resulted in an acute 1-hour exposure REL of 0.19

micrograms per cubic meter of air (µg/m^3). It is staff's opinion that in following the above-stated guidance from OEHHA to consider health endpoint, the strength and interpretation of the health studies, and the magnitude of combined safety factors, that an exceedence of the acute REL for acrolein will not result in a significant probability of an adverse health impact in the population.

In summary, staff believes that the true emissions of acrolein will be lower than the values used in the HRA, that the airborne concentrations at the PMI and at residences will be lower than what is predicted by staff's HRA, and that the acute REL does not reflect actual and real adverse effects. Therefore, staff believes that there is no significant probability of adverse health impacts as a result of emissions from the stacks of this power plant. And, to further ensure that the health of the public will not be impacted, staff is proposing that stack emissions be tested and a health risk assessment be conducted based upon those actual emissions. If the emissions show a significant risk or hazard, staff proposes that a number of engines be prohibited from operating until the project owner can demonstrate that the engines will meet with heath-based emissions limitations.

Mr. Toth also requests that staff conduct several studies and assessments including a cancer risk assessment using an association found between an 8% increase in lung cancer for each 10 µg/m^3 increase in PM2.5 in ambient air as described in the 2002 Pope study and a multi-part long-term analysis of the health impact of acrolein on the local area surrounding this plant.

Staff once again wishes to reiterate what is described in the PSA and FSA under the heading **Method and Threshold for Determining Significance.** Staff relies on other state and federal agencies (ARB, OEHHA, California Department of Public Health, Alameda County Department of Public Health, the BAAQMD, U.S. EPA, etc.) to conduct the type of studies he has requested. When this information becomes available, staff will then use this information in health risk assessments for power plant licensing.

Staff also points out that the PM2.5 emitted from the proposed power plant will be off-set by reducing emissions or retiring emission reduction credits from other sources. That some of these reductions would occur in areas within the Bay Area air basin distant to Hayward is appropriate in that the existing background airborne particulate levels are a regional issue and come from regional sources. Thus, the impact of PM2.5 emissions from this power plant would be mitigated.

Additional comments on public health issues were received from Mr. Travis Young, Mr. Robert Sarvey, and Ms. Cynthia Padilla Chavez. Mr. Young raised concerns about acrolein emissions; staff's response to Mr. Toth (above) on this same issue covers these concerns as well. Mr. Sarvey wrote in support of staff's proposed condition **Public Health-1** and Ms. Chavez sent an e-mail expressing concerns about possible impacts of emissions on children and about hexavalent chromium. Staff responded to Ms. Chavez in an e-mail dated September 10, 2007 that first, there will be no hexavalent chromium used at this power plant -- or any other power plant licensed by the Energy Commission -- and second, the minute amount of contaminants that would be emitted from the proposed Eastshore project would not result in birth defects, fetal toxicity, or maternal toxicity. The acceptable levels of exposure (termed RELs or Reference

Exposure Levels) are determined by the California EPA Office of Environmental Health Hazard Assessment and are set to ensure that no adverse effects would occur to even the most sensitive members of the public. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of Eastshore will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **Public Health**.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of Eastshore Energy Center and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed Eastshore project uses a health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the Eastshore project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. Furthermore, a quantitative assessment of the impacts of the Eastshore project combined with the impacts of the proposed Russell City power plant indicates that the two projects would not create a significant cumulative impact.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall, within 270 days of starting commercial operations, provide the results of a source test on the number of engine exhaust stacks required below and a human health risk assessment (HRA) to the Compliance Project Manager (CPM). The source test and human health risk assessment shall be conducted according to protocols reviewed and commented on by the Bay Area Air Quality Management District and reviewed and approved by the CPM, and shall be submitted to the CPM not less than 60 days after the date of starting commercial operations. The source test and HRA shall include the quantitative analysis and assessment of the following toxic air contaminants: acetaldehyde, acrolein, benzene, 1,3-butadiene, ethyl benzene, formaldehyde, naphthalene and all PAHs (including speciation of all PAHs emitted in the gaseous and particulate phases), propylene, toluene, and xylenes. The source test results and human health risk assessment shall confirm that the theoretical maximum cancer risk at the point of maximum impact is less than 10 in one million and the acute and chronic Hazard Indices are less than 1.0. If the health risk assessment shows a cancer risk greater than 10 in one million or a Hazard Index greater than 1.0, operation of the power plant shall be restricted to the number of engines that the CPM determines will represent a risk of less than 10 in one million or

a Hazard Index of less than 1.0 until the project owner can certify that the risk of operating all engines does not create a theoretical maximum cancer risk greater than 10 in one million or an acute or chronic Hazard Index greater than 1.0 at the point of maximum impact.

The number of engine exhaust stacks to be sampled shall be determined in the following manner:

1. Four (4) engines shall be randomly chosen by the owner for stack testing and approved by the CPM. If stack testing results for each contaminant described above on all four engines falls within two standard deviations of the arithmetic mean of each individual contaminant, no further engines need be tested.

2. If any contaminants measured in the stack test fall outside two standard deviations of the arithmetic mean for that contaminant, an additional four (4) engines, chosen at random by the owner and approved by the CPM, shall be stack tested for all contaminants that fell outside two standard deviations of the arithmetic mean. If stack testing results for each contaminant described above on all eight engines tested fall within two standard deviations of the arithmetic mean of each individual contaminant, no further engines need be tested. The project owner may request relief from further stack testing requirements by providing the CPM a written request with documentation explaining that further testing would not result in a significant change in the health risk assessment results.

3. This process shall be continued until either the results for all engines tested fall within two standard deviations of the arithmetic mean of each individual contaminant for all engines tested or all fourteen (14) engines are tested.

4. The HRA described above shall be based on all data produced for all engines tested under this protocol.

Verification: Not less than sixty (60) days after the start of commercial operations, the project owner shall provide a copy of the source test and human health risk assessment protocols to the BAAQMD for review and comment and to the CPM for review and approval. Included in the test protocol shall be the list of four (4) engines randomly chosen for the initial sampling. Subsequent to the initial testing, any additional engines chosen for testing shall be submitted to the CPM for review and approval. Not less than thirty (30) days after each group of source tests has been completed, the project owner shall provide the source test results to the BAAQMD and the CPM. If the source testing is consistent with item #2 above, the owner shall submit the HRA to the BAAQMD for review and comment and to the CPM for review and approval not later than sixty (60) days after the date of the test. If additional tests are required, the project owner shall submit in sequence the next set of randomly chosen engines for testing to the CPM for approval until either all testing conforms to the protocol described above or all 14 engines are tested. When the project owner has fulfilled the requirement for testing as described above, the project owner shall submit all test results and the HRA to the BAAQMD for review and comment and to the CPM for approval within sixty (60)

days of the date of the last test or not later than 270 days after the date of starting commercial operations, whichever is sooner.

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PUBLIC HEALTH Appendix A

Asthma in Hayward and Alameda County

March 19, 2007
(revised October 30, 2007)

A number of community members expressed concern about the incidence of asthma in the Hayward area and the effect of the project on asthma. In our efforts to respond to this concern, staff gathered a significant amount of data about the incidence of asthma in the project area. This data does not indicate that there are any unusual circumstances with respect to asthma incidence. In addition, staff's review of the scientific literature supports its finding that the emissions from this project will not create any significant adverse health impact. Nonetheless, we include the results of our data gathering efforts as an Appendix to the FSA in an effort to provide as much information as possible to members of the public, even when that information is not needed to support the staff's conclusion.

This report presents data on asthma mortality, prevalence and hospitalization rates reported in the United States, California, Bay Area Counties, Alameda County and the City of Hayward. In some cases, this data is compared to Healthy People 2010 objectives, which are defined by the US Department of Health and Human Services in an effort to measure and monitor the Nation's health (DHHS 2000). In 2006 the progress toward these objectives was evaluated in the “Healthy People 2010 Midcourse Review,” and some objectives were modified (DHHS 2006). Healthy People 2010 objectives specific to asthma are listed below.

Reduce asthma deaths

Objective	Age Group	Rate per 100,000
24-1a	Children under age 5 years	0.1
24-1b	Children aged 5 to 14 years	0.1
24-1c	Adolescents and adults aged 15 to 34 years	0.2
24-1d	Adults aged 35 to 64 years	0.8
24-1e	Adults aged 65 years and older	4.7

Reduce hospitalizations for asthma

Objective	Age Group	Rate per 100,000
1-9a	Children under age 18 years	173
24-2a	Children under age 5 years	250
24-2b	Children and adults aged 5 to 64 years	77
24-2c	Adults aged 65 years and older	110

Asthma Mortality

United States

In 2001 asthma was the cause of death for 4,269 Americans, which represents an age-adjusted asthma mortality rate of 1.5 per 100,000 for all races. A higher mortality rate was seen for females than males: for white females the mortality rate was 1.5 per 100,000 compared to 0.9 per 100,000 for white males; for African-American females the rate was 3.8 per 100,000 compared to 3.2 per 100,000 for African-American males. For African-Americans the asthma mortality rate was three times greater than for whites (3.6 per 100,000 for African-Americans of both sexes compared to 1.2 per 100,000 for whites of both sexes) (ALA 2004).

California, Alameda and Neighboring Counties

The California Department of Health Services reported asthma mortality statistics for 1990 to 1997 in the "California Asthma Mortality Chart Book" (DHS 2000). Mortality rates for children and all ages for the State of California, Alameda County and Alameda's neighboring counties Contra Costa, San Joaquin, Santa Clara and San Mateo were 2-3 times greater for the African-American population compared to the non-Hispanic white population.

Age-adjusted asthma mortality rates for 1990 to 1997, all ages (in deaths per 100,000; DHS 2000):

	Total	Non-Hispanic White	African-American	Hispanic	Asian/ Pacific Islander
California	1.88	1.77	4.30	1.10	2.55
Alameda	2.34	1.55	5.66	-	2.92
Contra Costa	1.71	1.55	3.80	-	-
San Joaquin	2.59	2.11	-	-	4.94
Santa Clara	1.35	1.33	-	-	2.13
San Mateo	1.96	1.71	-	-	2.81

Alameda County

In Alameda County, the asthma mortality rate in 2001-2003 for 35-64 year old residents exceeded the Healthy People 2010 target of 0.8 per 100,000 by more than a factor of two, for a rate of 1.9 per 100,000. For residents over 65 years old, the mortality rate was 9.2 per 100,000 and for that age group the HP 2010 objective is 4.7 per 100,000 (ACPHD 2006). For the period of 1999-2000, ACPHD reports asthma mortality in Alameda County of 2.4 per 100,000 population in ages 35-64 and 10.5 per 100,000 in ages over 65 (ACPHD 2003), both of which exceed the HP 2010 objective for asthma mortality.

The 2001-2003 asthma mortality rate in Alameda County was reported by race/ethnicity by the Alameda County Public Health Department (ACPHD 2006). The mortality rate for African-American residents was found to be more than two times greater than that for White residents.

Asthma Mortality Rate by Race/Ethnicity (all ages, rates per 100,000):

All Races	1.9
White	1.4
African-American	3.3
Asian	2.5
Hispanic	-

Asthma Prevalence

United States

Results of the Behavioral Risk Factor Surveillance System (BRFSS) conducted in 2000-2002 indicated that 11.8% of US adults had lifetime asthma in 2002 while 7.5% had current asthma in 2002 (ALA 2004).

California

Data on lifetime asthma prevalence in California were collected in the 2001 California Health Interview Survey (CHIS; Meng 2003). CHIS conducted phone interviews of over 55,000 households from throughout California between November 2000 and September 2001. The overall response rate was 37%. Asthma symptom prevalence refers to people who have been previously diagnosed with asthma and experienced asthma symptoms in 2001. Pertinent data collected on asthma symptom prevalence in California by race/ethnicity in 2001 are summarized below (Meng 2003).

Lifetime Asthma Prevalence by Race/Ethnicity in California, 2001:

	Children (ages 1-17)	Adults (ages >18)
White	14.3%	13.1%
African-American	21.1%	16.2%
Asian	11.7%	9.2%
Hispanic	9.7%	7.0%

Data from the 2003 CHIS on prevalence of active asthma by race/ethnicity in California are summarized in a policy brief published by the UCLA Center for Health Policy Research (Meng 2007):

Prevalence of Active Asthma by Race/Ethnicity in California, 2003:

	Children (ages 0-17)	Adults (ages >18)
White	10%	9%
African-American	17%	10%
American Indian/Alaska Native	17%	13%
Asian	7%	5%
Hispanic	7%	5%

Meng (2003) also reports statewide lifetime asthma prevalence rates by age from the 2001 CHIS:

Lifetime Asthma Prevalence in California by Age, 2001:

All Ages	11.9%
Children (< 6 yrs)	8.8%
Children (ages 6-11)	13.7%
Adolescents (ages 12-17)	16.3%
Young adults (ages 18-24)	14.4%
Adults (> 25 yrs)	11.1%

Bay Area Counties

Lifetime asthma prevalence in children and adults in California and counties was reported by Lund (2005a, 2005b) based on data from the 2003 CHIS. Results are summarized below for California, Alameda County and neighboring counties.

Lifetime Asthma Prevalence by Age, 2003:

	Children (ages 1-17)	Adults (ages >18)
California	14.8%	12.3%
Alameda County	16.5%	12.1%
Contra Costa County	18.3%	15.0%
San Joaquin County	23.1%	15.8%
Santa Clara County	14.5%	13.1%
San Mateo County	12.6%	11.1%

Results of lifetime asthma prevalence from the 2001 CHIS were also presented by age group for California counties (Meng 2003). Data for the Greater San Francisco Bay Area, Alameda County and neighboring counties are presented below.

Lifetime Asthma Prevalence by Age, 2001:

	Children (ages 1-17)	Adults (ages >18)	All Ages
Greater Bay Area	10.2%	9.0%	9.3%
Alameda County	9.9%	10.2%	10.1%
Contra Costa County	9.1%	10.4%	10.0%
San Joaquin County	10.1%	8.9%	9.3%
Santa Clara County	9.3%	8.0%	8.3%
San Mateo County	9.0%	6.1%	6.7%

Hayward Legislative Districts

Mendez-Luck (2004) reported sub-county data on asthma symptom prevalence for California Assembly Districts, Congressional Districts, and Senate Districts. Rates were based on data from the 2001 California Health Interview Survey, the 2000 census and 2002 California Department of Finance data. The city of Hayward lies within Assembly District 18, Congressional District 13, and Senate District 10. Asthma symptom prevalence rates by legislative district for Hayward are shown below.

	Children Under 17 yrs	Adults 18-64 yrs	Adults Over 65 yrs
Assembly District 18	10%	10%	12%
Congressional District 13	10%	9%	10%
Senate District 10	10%	9%	10%

Asthma Hospitalizations

United States

The American Lung Association (2004) reports that hospital discharge rates for asthma in the United States decreased from 1995 to 2001 for all age groups. In 2001 the hospital discharge rate for African-Americans with asthma was 317 per 100,000, more than 3 times greater than the rate for whites (101 per 100,000).

California

Stockman (2004) report age-adjusted asthma hospitalization rates for California residents by gender, age and race/ethnicity in 2000. As seen in the data below, the rate

of asthma hospitalizations in African-Americans was almost four times higher for children and three times higher for adults compared to the rates reported for Non-Hispanic Whites.

Asthma hospitalization rate by race/ethnicity in California (cases per 100,000):

	Non-Hispanic White	African American
Children 0-17 years old		
Male	171	635
Female	102	417
Adults >18 years old		
Male	41	148
Female	106	324

Bay Area Counties

Age-adjusted asthma hospitalization rates are reported by the California Department of Health Services (DHS) in California and in Alameda and San Francisco Bay Area counties in the updated County Chart Book for asthma hospitalization rates in California counties for 1998 to 2000 (DHS 2003). Age-adjusted asthma hospitalization rates by race/ethnicity for all ages and for children (ages 0-14) are presented below.

Asthma hospitalization rate by age and race/ethnicity in California and Bay Area Counties (cases per 100,000):

	Total	non-Hispanic White	African-American	Hispanic	Asian/ Pacific Islander
All Ages:					
California	111	95	330	103	78
Alameda	179	111	431	117	110
Contra Costa	129	95	379	109	98
San Joaquin	137	131	399	108	103
Santa Clara	81	71	196	94	79
San Mateo	79	75	252	67	81
Children (< 15 yrs):					
California	181	149	576	149	97
Alameda	379	177	968	239	178
Contra Costa	211	129	627	155	138
San Joaquin	199	200	577	173	76
Santa Clara	121	111	226	139	79
San Mateo	131	131	259	110	99

In 1999, Nancy Warren of the Bay Area Regional Asthma Management and Prevention Initiative (RAMP) reported and compared asthma hospitalization rates in San Francisco, Alameda, Contra Costa and Solano counties for 1994-1996 (Warren 1999). In the Warren study, hospital discharge data were obtained from the Office of Statewide Planning and Development (OSHPD) Hospital Discharge Database 1994-1996.

Overall, Alameda County had an age-adjusted rate of 187 per 100,000 (all ages). Rates in the three other Bay Area counties are shown below (Warren 1999):

Age-adjusted asthma hospitalization rate for Bay Area Counties, by age:

County	All Ages	Children (< 15 yrs)
San Francisco	190	441
Alameda	187	439
Contra Costa	127	210
Solano	127	197

Alameda County

The Alameda County Public Health Department (ACPHD 2006) reports asthma hospitalization rates for children and adults in Alameda County and California (age-specific rates, 2001-2003 average):

	Asthma Hospitalization Rate (cases per 100,000)		
Age	Alameda Co.	California	Healthy People 2010
Under 5 years	683	336	250
5 - 64 years	106	75	77
65 years and above	227	177	110

According to the Alameda County Public Health Department's "Alameda County Health Status Report 2003", the age-adjusted rate of asthma hospitalizations in children under age 15 in Alameda County was 420 per 100,000 for 1998-2000, which can be compared to the California rate for the same time period of 196 per 100,000. The Healthy People 2010 objective is 173 per 100,000 for children younger than 18 (DHHS 2006). The highest rates in the County, exceeding the Healthy People 2010 objective by more than two times, occur along the Interstate 880 corridor, in neighborhoods of the cities of Berkeley and Oakland (ACPHD 2003).

The Alameda County Public Health Department (ACPHD 2006) reports asthma hospitalization rates for all ages and children under five years old by race/ethnicity for 2001-2003. Rates were more than 2.5 times higher for African-American residents compared to the county rate for all ages and 2.3 times higher for African-American children under five years old compared to the county rate. All rates reported for Alameda children under five years old exceeded the Healthy People 2010 target for that age of 250 per 100,000, as well as the rate for California children of 336 per 100,000.

Asthma hospitalization rate by race/ethnicity in Alameda County (cases per 100,000):

	All ages	Children (< 5 yrs)
All Races	161	683
White	112	424
African-American	417	1,573
Asian	79	304
Hispanic	121	565

By ethnicity, African-Americans in Alameda County exhibited the highest asthma hospitalization rate for all ages and children. The Alameda County Public Health Department presented rates for asthma hospitalization for Alameda County by race/ethnicity, age and gender. Rates are age-adjusted, average for 1998-2000 (ACPHD 2003). In children under 15 years old, the percent of the total number hospitalized is given for each race/ethnicity. Results indicate that almost half of the children hospitalized in Alameda County in 1998-2000 were African-American.

	Asthma hospitalization rate (cases per 100,000)			
	Male	Female	Both	Percent of total # hospitalized
All Ages:				
Total	180	195	190	-
White	98	129	115	n/a
African-American	445	458	458	n/a
Asian	120	111	116	n/a
Hispanic	115	130	123	n/a
Children (<15 years old):				
Total	518	318	420	-
White	252	135	195	15.6%
African-American	1,281	859	1,073	48.4%
Asian	263	130	198	10.1%
Hispanic	330	201	267	16.3%

Alameda County Zip Codes, All Ages

The Warren study (1999) reports that in Alameda County, in 1994-1996, the highest age-adjusted annual asthma hospitalization rate for all ages occurred in zip code 94612, Oakland/Downtown, at 518 per 100,000. More recent data was provided by the Community Action to Fight Asthma (CAFA 2004) for three-year averaged hospitalization rates for four Bay Area counties for the years 1999-2001. Data was obtained from OSHPD (Office of Statewide Healthcare Planning and Development) at the zip code tabulation area level (ZCTA). The Downtown Oakland neighborhood had the highest age-adjusted annual asthma hospitalization rate for all ages: 572 per 100,000 for 1999-2001. Of the 45 zip codes in Alameda County reported in the CAFA 2004 data, 39 zip codes had hospitalization rates for all ages above the Healthy People 2010 value for ages 5-64 of 77 per 100,000.

Data from these two studies are summarized below for Hayward zip codes and for Alameda County zip codes with asthma hospitalization rates greater than four times the Healthy People 2010 objective of 77 per 100,000.

Asthma hospitalization rate, all ages (cases per 100,000):

Zip Code	Neighborhood	Warren (1999) 1994-1996		CAFA (2004) 1999-2001	
		Rate	95% CI	Rate	95% CI
94541	Hayward	184	(163-207)	171	(152-190)
94542	Hayward	-		141	(95-188)
94544	Hayward	185	(165-206)	169	(152-186)
94545	Hayward	191	(160-225)	144	(118-171)
94603	Oakland/98th Ave.	444	(399-492)	436	(395-478)
94605	Oakland/Zoo	323	(291-357)	413	(378-449)
94607	West Oakland	411	(362-462)	528	(471-585)
94608	Emeryville	485	(433-541)	453	(401-506)
94609	North Oakland	403	(354-456)	479	(392-481)
94612	Oakland/Downtown	518	(431-613)	572	(418-541)
94621	Oakland/Coliseum	484	(436-534)	414	(373-455)
94702	Berkeley/South	266	(219-317)	321	(262-379)

Alameda County Zip Codes, Children

Thirty-six zip codes in Alameda County had hospitalization rates for 1999-2001 for children under 15 years old above the Healthy People 2010 target value of 173 per 100,000 for children under the age of 18 (CAFA 2004). The highest rate occurred in zip code 94612, Downtown Oakland, for 1,372 per 100,000 (CAFA 2004).

The following table presents data from the Warren study and the CAFA report for Hayward zip codes and for Alameda County zip codes with childhood asthma hospitalization rates greater than five times the Healthy People 2010 objective of 173 per 100,000 for children under 18 years old (CAFA 2004).

Asthma hospitalization rate, children under 15 years old (cases per 100,000; confidence intervals not presented in Warren study):

Zip Code	Neighborhood	Warren (1999) 1994-1996	CAFA (2004) 1999-2001	
		Rate	Rate	95% CI
94541	Hayward	400	347	*(290 – 405)*
94542	Hayward	-	303	*(149 – 454)*
94544	Hayward	325	253	*(210 – 296)*
94545	Hayward	400	271	*(190 – 353)*
94603	Oak/98th Avenue	1,069	942	(824-1061)
94605	Oak/Zoo	846	1,064	(943-1,184)
94607	West Oakland	1,046	1,304	(1,109-1,499)
94608	Emeryville	1,137	1,171	(980-1,362)
94609	North Oakland	1,114	1,276	(1,050-1,503)
94612	Oak/Downtown	1,131	1,372	(1,022-1,722)
94621	Oak/Coliseum	1,006	1,001	(879-1,123)
94702	Berkeley	617	954	(725-1,183)

Hayward

In 2004, the Alameda County Public Health Department published a health profile report for Hayward (ACPHD 2004). This report presented asthma hospitalization rates for Hayward and Alameda County between 1999-2001 by age, gender and race/ethnicity. Results are summarized below.

Asthma Hospitalization Rate for Hayward and Alameda County, 1999-2001, by age, gender and race/ethnicity, cases per 100,000:

	Children (< 15 years old)		All Ages	
	Hayward	Alameda	Hayward	Alameda
Total	276	398	168	178
Gender				
Male	350	497	150	167
Female	189	294	183	185
Race/ethnicity				
White	304	212	181	117
African-American	452	1030	265	446
Asian/Pacific Islander	122	164	132	96
Hispanic	188	250	117	128

The Alameda County Public Health Department (ACPHD 2001) reported age-adjusted rates of asthma hospitalizations in zip code 94544, which is located in South Hayward. South Hayward lies east of the proposed Eastshore facility, which is located in zip code 94545 (see **Public Health Appendix A Figure 1**). Rates are presented below:

	Asthma Hospitalization Rate Children under 15 years old (cases per 100,000)
Zip code 94544 (South Hayward)	169
Alameda County	364
Healthy People 2010 Objective (Children under 18 years old)	173

Demographics of Alameda County and Hayward

According to the latest United States census, the population of Alameda County in 2000 is 1,443,741 persons, 14.9% of whom are African-American, 40.9% White, 20.4% Asian and 19.0% Hispanic (Census 2000).

The population of the city of Hayward represents 9.7% of the population of Alameda County with 140,030 persons in 2000, 11.0% of whom are African-American, 43.0% White, 19.0% Asian and 34.2% Hispanic (Census 2000).

Discussion

In Alameda County, there appear to be ethnic populations and neighborhoods with higher asthma mortality and hospitalization rates as compared to other populations, counties and neighborhoods in the area. Alameda County has a higher asthma mortality rate than California, as well as higher asthma prevalence and hospitalization rates. The asthma mortality rate for adults in Alameda County is about twice the Healthy People 2010 rate. Asthma mortality is also about 2 times greater in African-Americans than non-Hispanic Whites in Alameda County.

Asthma hospitalization rates in Alameda County exceed rates reported for the State of California by 1.6 times for all ages and 2.1 times for children. The Alameda County rates also exceed Healthy People 2010 rates; in children under five years old the Alameda rate is 2.7 times greater than the HP 2010 objective.

African-American adults and children in Alameda County have asthma hospitalization rates 4 to 5 times higher than non-Hispanic White residents of Alameda. This same racial disparity is reflected in asthma hospitalization data for the State of California. In Alameda County, Downtown Oakland has the highest rate of asthma hospitalization in adults and children.

Asthma hospitalization rates reported for the City of Hayward are lower than rates reported for Alameda County but exceed the HP 2010 rates. In Hayward, the asthma hospitalization rate for African American children and adults is approximately 1.5 times greater than the rate for White children and adults. The asthma hospitalization rate for children under 15 years old in South Hayward is about half of the county rate and slightly less than the HP 2010 rate for children under 18 years old.

Seasonality of Asthma Hospitalizations in Alameda County and Hayward

At the request of staff, California Breathing[3] epidemiologist Meredith Milet prepared data on the number of asthma hospitalizations by month and year for 2002-2006 for Alameda County, Hayward and Zip Code 94544. The source of the data is the Office of Statewide Health Planning and Development (OSHPD) Patient Discharge Databases, 2002-2006. Hospitalizations with a principal diagnosis of asthma were identified using ICD-9 code 493.

Asthma hospitalization data for Alameda County were summarized for all age groups, 0-5 years old, 6-18 years old, 19-64 years old and over 65 years old. Data for Hayward (including zip codes 94540, 94541, 94542, 94543, 94544 and 94545) were summarized for all ages, 0-18 years old and over 19 years old. Data for Zip code 94544 were summarized for all ages only. Counts of five or less were not reported due to patient privacy concerns.

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[3] California Breathing is a program working to address asthma in California from a public health perspective, to advance strategies in the Strategic Plan for Asthma in California. It is located within the Environmental Health Investigations Branch (EHIB) of the California Department of Public Health with funding from the Centers for Disease Control and Prevention. http://www.californiabreathing.org/

PUBLIC HEALTH Appendix A Figure 2 presents the asthma hospitalization data plotted by month for the five years evaluated for Alameda County for all age groups combined and for four age ranges. **Figure 3** presents the same data for the four age ranges only. Review of the plots shows seasonality of asthma hospitalizations in Alameda County. For all age groups, the asthma hospitalization rate peaked in December and January and was lowest in July and August. For children 0-5 years old, the first peak was in January with a low in July and a second peak in September. For children 6-18 years old, the rate peaked in May and September and was lowest in July. For adults 19-64 years old, the rate peaked in December through February and was lowest in August. For the 65 years and older age group, the rate peaked in December through February and was lowest in September.

Data for 2002-2006 in Hayward is presented in **Figures 4** and **5**. **Figure 4** presents data for all ages combined and for two age ranges while **Figure 5** presents the data for the two age ranges only. For months in which fewer than five cases occurred, 2.5 cases (the average of 0-5) were assumed. This occurred in 24 of the 60 months included in this evaluation for the 0-18 year old age group and 2 of the 60 months in the adult (19+) age group. Review of the plots shows seasonality of asthma hospitalizations in Hayward. For all age groups the asthma hospitalization peaked in February and was lowest in August. For children 0-18 years old, the rate peaked in December to February and was lowest in July and August. For adults in the 19+ age group, the rate peaked in February and was lowest in August.

Figure 2 presents data for Zip Code 94544, for all ages, for 2002-2006. A partial Zip Code map of the Hayward area is presented in **Figure 1**, with the approximate location of the Eastshore facility (located in Zip Code 94545) indicated. Three of the 60 months evaluated for Zip Code 94544 had fewer than 5 cases and were assumed to have 2.5 cases, as explained above. Review of the plot shows seasonality of asthma hospitalizations in Zip Code 94544 with a peak in asthma hospitalizations in February and a low in August.

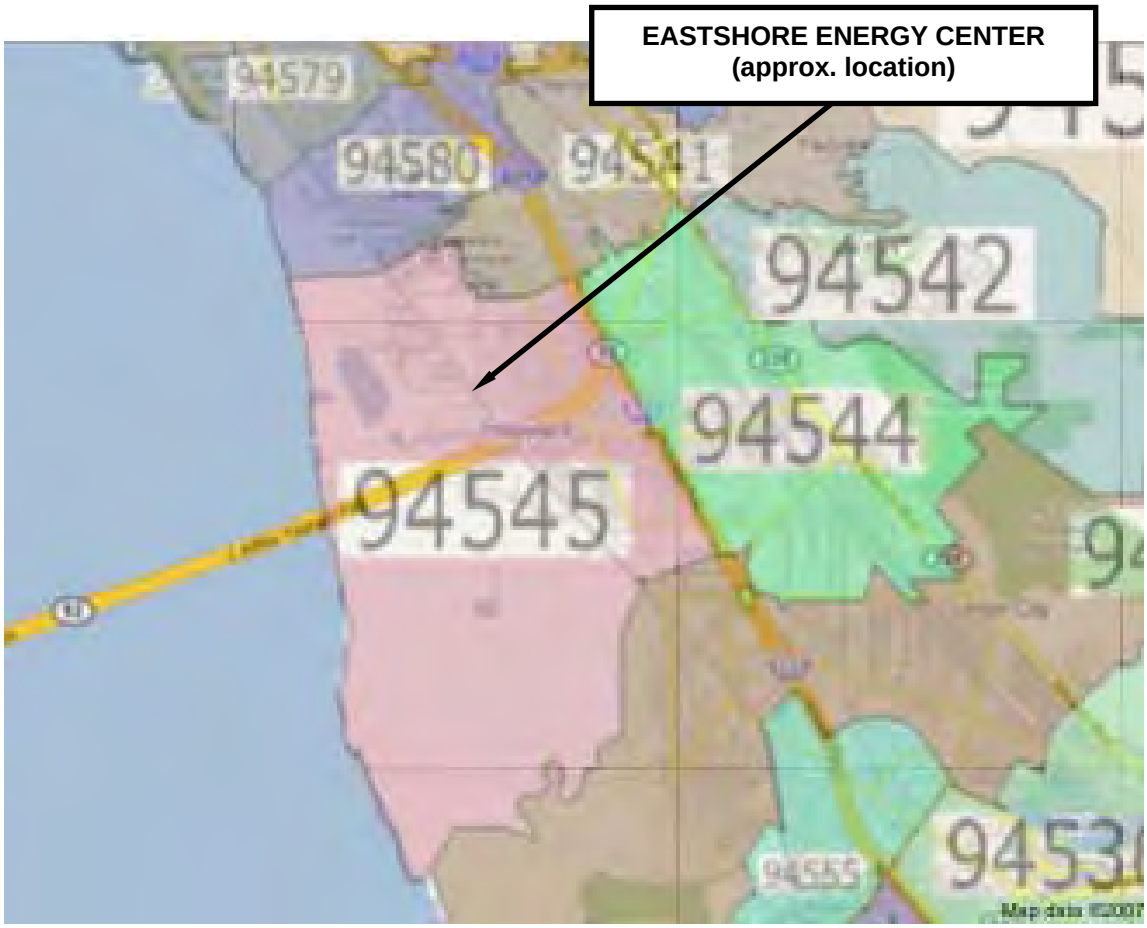
Seasonality of Asthma Hospitalizations Reported in the Literature

The seasonality of asthma hospitalizations has been well documented in the scientific literature. Studies have shown that in pediatric populations throughout the world, rates for hospitalizations are highest in winter/spring and in autumn, and lowest in summer. Seasonality of asthma hospital admissions in pediatric populations has been reported in Finland (Harju 1997), Australia (D'Souza 2007), Taiwan (Kao 2001), and Athens, Greece (Priftis 2006).

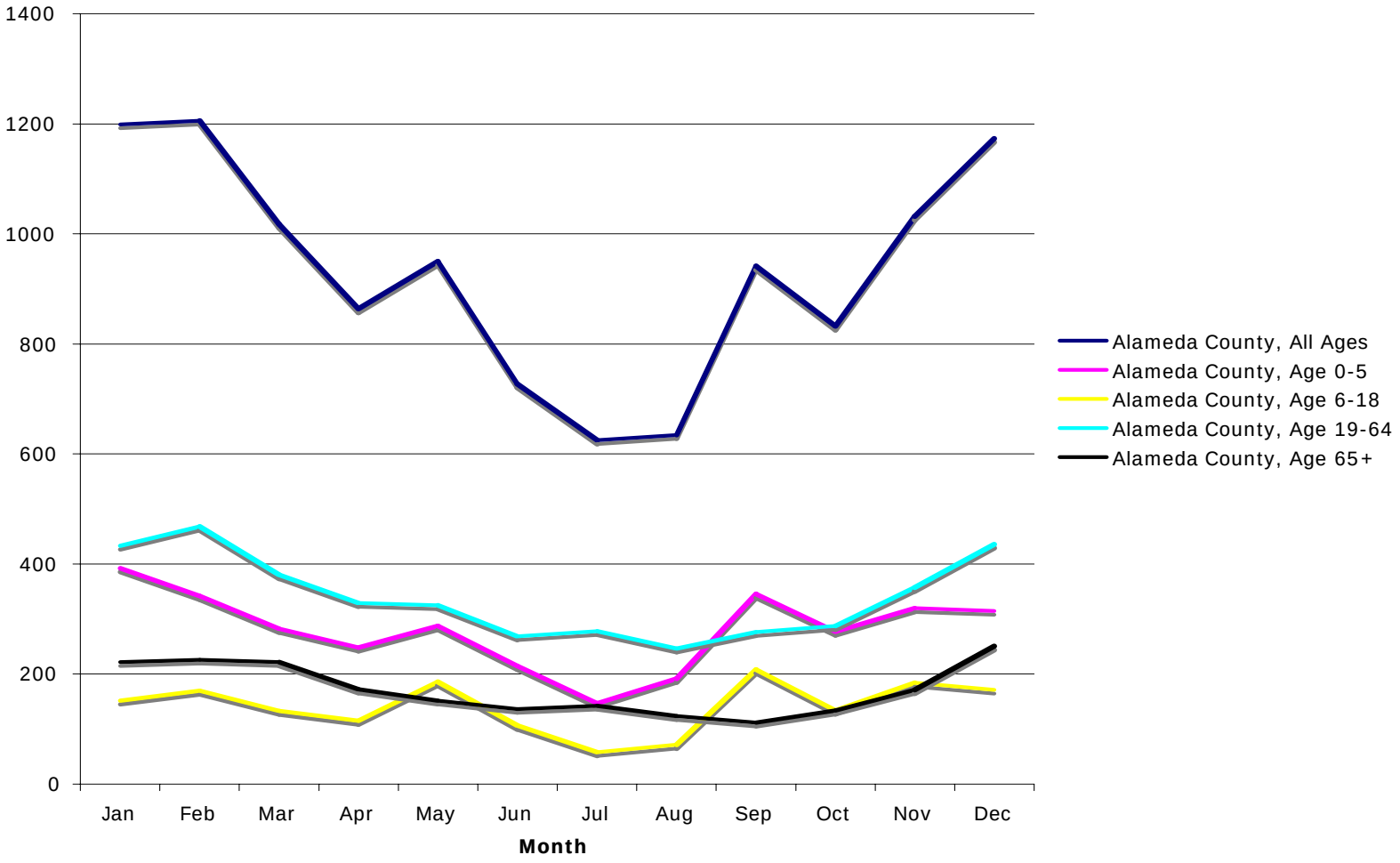
Studies of asthma patients of all ages in the US reported the asthma hospitalization rate peaked in September through November for patients 5-34 years old (Weiss 1990). A similar pattern in the US was reported by Pendergraft (2005) in which the rate of asthma hospitalizations in patients over 5 years old peaked in winter months and was lowest in summer months. Similar seasonal variations have been reported in Malta (Grech 2002), Ontario, Canada (Crighton 2001), Taiwan (Chen 2006), Finland (Harju 1998), England and Wales (Fleming 2000), and New Zealand (Kimbell-Dunn 2000).

Asthma hospitalization seasonality has been reported in Maryland, based on data from 1986-1999, where peaks in pediatric asthma hospital admissions occur in the winter/spring and autumn seasons (Kimes 2004) and are lowest in the summer (Blaisdell 2002). In New York, monthly hospitalization rates in patients younger than 5 years old (data from 1990-2004) have been reported to increase in the fall and decline in the summer months (Lin 2007). A similar pattern of summer trough and late autumn peak in hospitalizations was reported in Chicago for all ages (Thomas 1999) and in Minnesota, as well as in Michigan, Vermont, New Hampshire and Nebraska (Minnesota 2005, Michigan 2000). The Pediatric/Adult Asthma Coalition of New Jersey (2006) reports that in September, pediatric asthma hospitalization rates are five times greater than rates in July for elementary school age children and nearly six times greater for high school students.

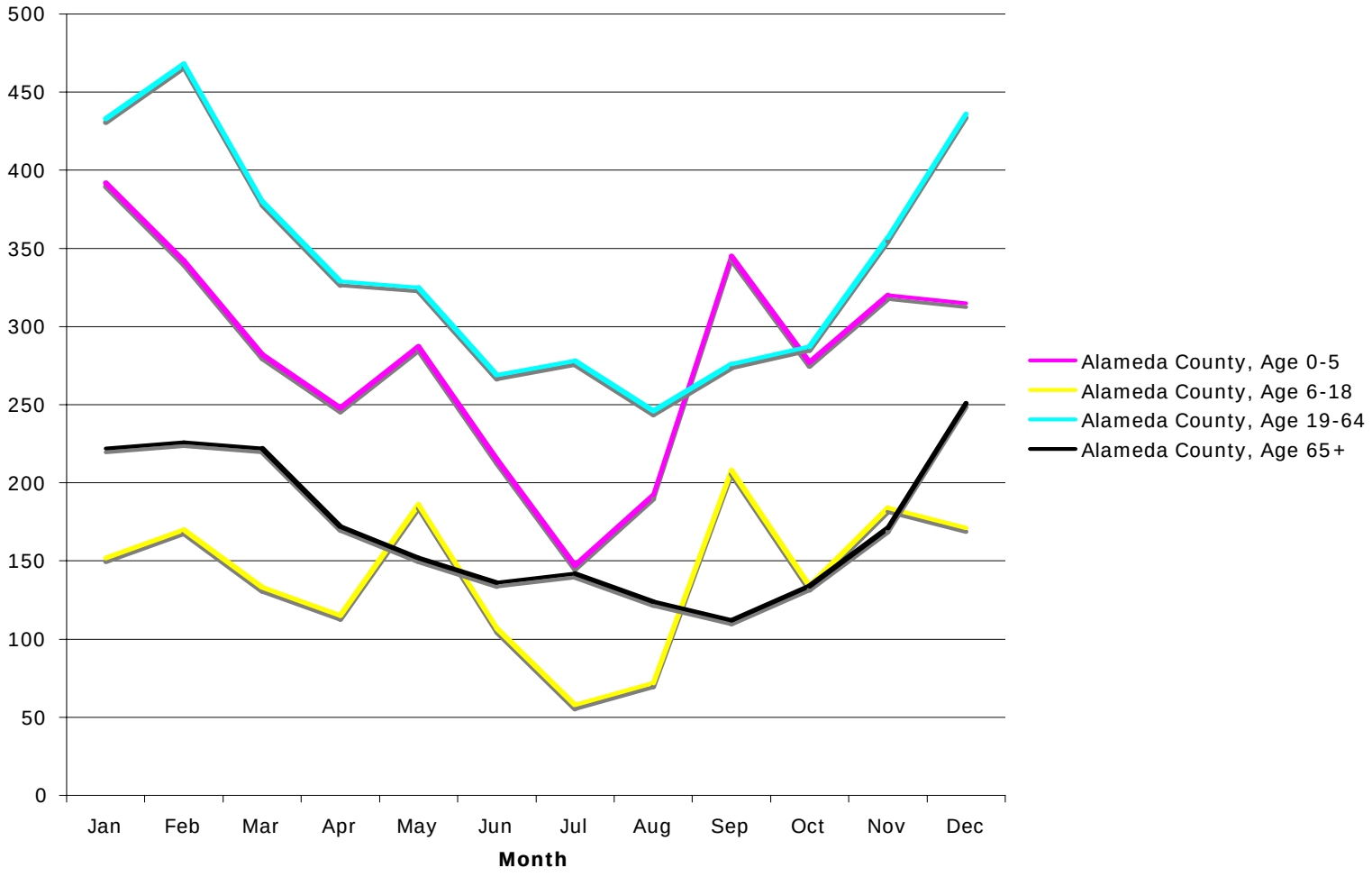
PUBLIC HEALTH Appendix A Figure 1. Hayward Zip Code Map.



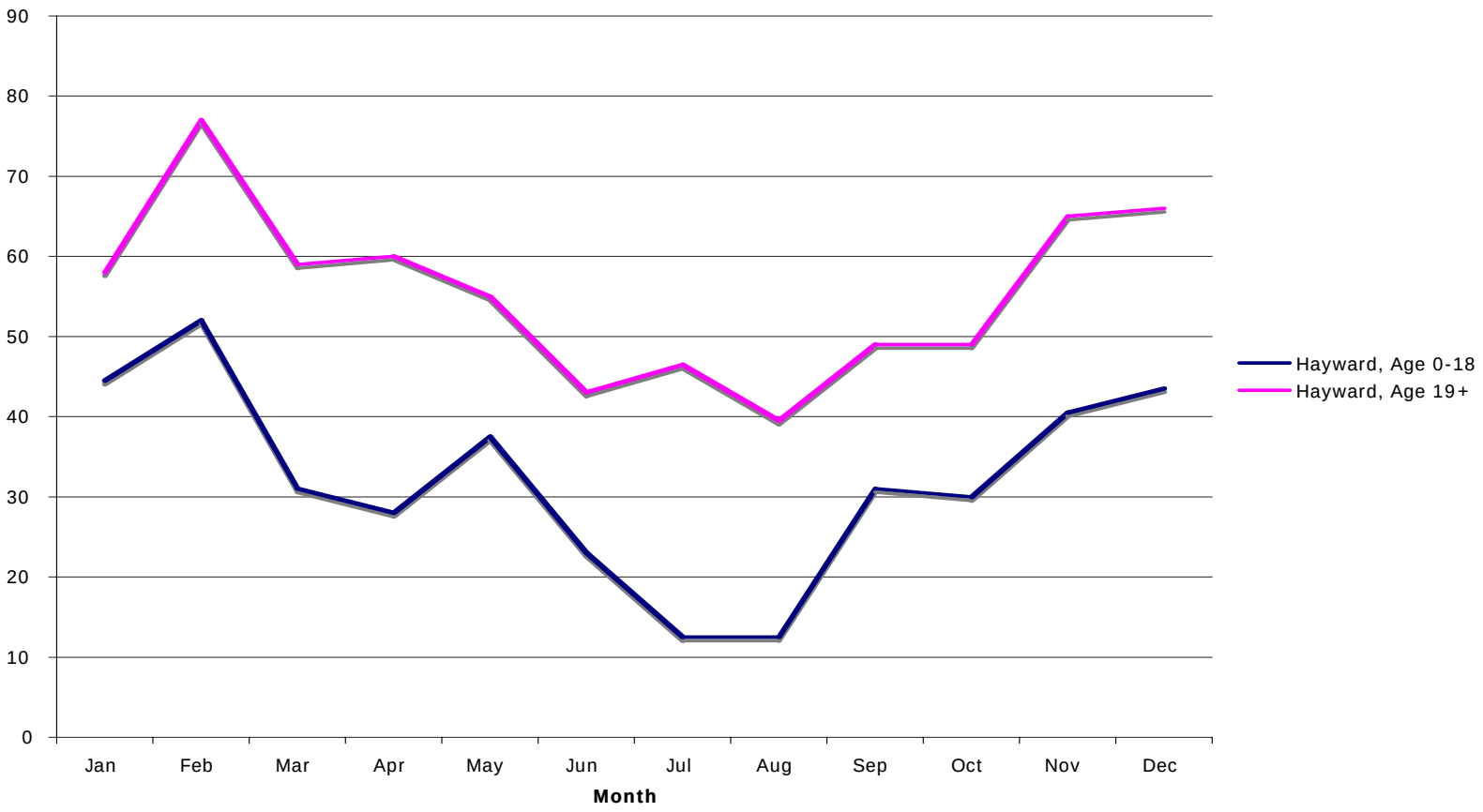
PUBLIC HEALTH Appendix A Figure 2
2002-2006 Asthma Hospitalizations in Alameda County, overall and by four age groups.



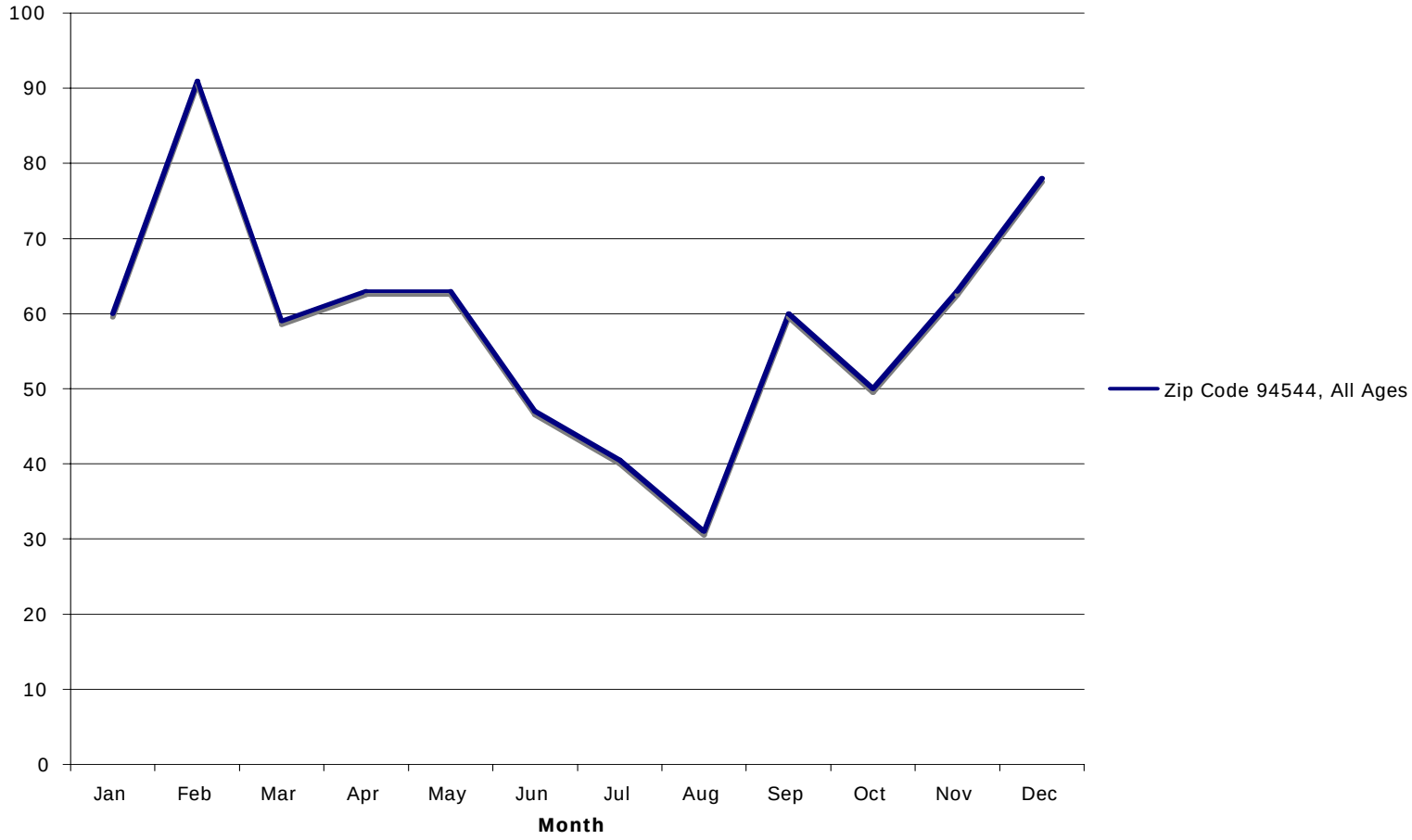
PUBLIC HEALTH Appendix A Figure 3
2002-2006 Asthma Hospitalizations in Alameda County, by four age groups.



PUBLIC HEALTH Appendix A Figure 4
2002-2006 Asthma Hospitalizations in Hayward, by two age groups.
Months for which fewer than 5 hospitalizations are reported are assumed to be average of 2.5 hospitalizations.
This occurred in 24/60 months for age 0-18 and 2/60 months for age 19+.



PUBLIC HEALTH Appendix A Figure 5
2002-2006 Asthma Hospitalizations in Zip Code 94544, all ages.
Months for which fewer than 5 hospitalizations are reported are assumed to be average of 2.5 hospitalizations.
This occurred in 3 of the 60 months reported.



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PUBLIC HEALTH Appendix B

Comparison of Sources of Emission Factors

May 30, 2007

Brief Description of CATEF Database

The California Air Toxics Emission Factor (CATEF) database contains approximately 2000 air toxics emission factors calculated from source test data collected for the Air Toxics Hot Spots Program. CATEF is the product of a research project completed by General Electric Energy and Environmental Research for the Air Resources Board (ARB). The ARB "believes that the CATEF database is of great assistance in estimating air toxics emissions, especially to those individuals and facilities operators required to report air toxics emissions for the Air Toxics Hot Spots Program". The ARB further notes that users should be aware that the sampling method puts the acrolein emission factors in doubt and until that issue is resolved, the ARB does not recommend using those emission factors.

CATEF and AP-42 Emission Factors

CATEF maximum and mean emission factors were obtained from ARB 1996 (Table 24). These values are the same as the ones obtained from the CATEF on-line database (accessed May 23, 2007). Values represent reciprocating internal combustion engines, fuel is natural gas, SCC code is 20200202, Lean/4S/>650 Hp.

In the CATEF database, emission factors are listed in units of lbs/MMcf. In order to convert to units of lbs/MMBtu (so as to be consistent with AP-42 values), a conversion factor of 1,020 Btu/cf was used. This conversion factor was obtained from the Eastshore AFC, page 8.1-6 and represents the heat value of the natural gas (California Public Utilities Commission grade) supplied by the PG&E gas system.

AP-42 emission factors were obtained from US EPA 1995. Values represent uncontrolled emission factors for 4-stroke lean-burn engines.

Emission factors from CATEF and AP-42 are compared below for three substances emitted.

Substance	**lbs/MMBtu**			**RATIO**	**RATIO**
		mean	max		
	from AP-42	*from CATEF, assume 1020 Btu/cf*	*from CATEF, assume 1020 Btu/cf*	*AP-42/mean CATEF*	*AP-42/max CATEF*
1,3-Butadiene	2.67E-04	3.60E-04	4.07E-04	0.74	0.66
Benzene	4.40E-04	2.14E-04	2.54E-04	2.1	1.7
Formaldehyde	5.28E-02	4.62E-03	2.05E-02	11	2.6

ARB and EPA Ratings of CATEF Values

ARB developed a detailed prioritization of source tests in order to develop the CATEF database of emission factors (ARB 1999, 1996). This procedure involved collecting and screening over 1000 source tests from data collected for the Air Toxics Hot Spots program, detailed validation of the data, and outlier analysis.

In the initial screening analysis, over half of the tests collected were eliminated and not used in emission factor development. In the majority of cases that were eliminated, either process rates were not provided or they had incorrect units.

Detailed validation of the remaining data was conducted to eliminate problematic data such that the best data sets were identified to be used to develop emission factors. Tests that passed the screening analysis were subjected to detailed validation in which data sets were checked for correct sampling and analysis procedures, possible high field blanks, calculation errors, and test result accuracy. Outliers were identified, evaluated and in some cases eliminated. Emissions data were then extracted from the test results, rated for quality and entered into the database.

Each emission factor can be assigned several ratings, including method rating (which relates to the test method used and level of supporting documentation provided) and population rating (based on the number of sources from which the data is derived). Levels of method, population, ARB and EPA ratings are given below.

Method Rating

A = Test was performed using a new or old ARB methodology and sufficient documentation was provided to validate the results.

B = Test was performed using a new or old EPA methodology and sufficient documentation was provided to validate the results.

C = Test was performed using a new or old ARB methodology and insufficient documentation was provided to validate the results.

D = Test was performed using a new or old EPA methodology and insufficient documentation was provided to validate the results.

E = An assumption was made in the emission factor calculation which could significantly affect the accuracy of the results.

Population Rating

1 = Source test data taken from many randomly chosen facilities in the industry population (5 or more sources).

2 = Source test data taken from a reasonable number of facilities (3 to 4 sources).

3 = Source test data taken from a small number of facilities, and there may be reason to suspect that the facilities do not represent a random sample of the industry (< 3 sources).

ARB Rating

ARB rating has the format xy-vn where x is the method rating, y is the population rating, and n is the order of magnitude difference between the minimum and maximum.

EPA RATING*

A = Developed from many random facilities using current source test methods and enough information available to validate the results.

B = Developed from reasonable number of facilities using current source test methods and enough information available to validate the results.

C = Developed from reasonable number of facilities using current source test methods.

D = Developed from small number of facilities using current source test methods.

E = Developed from small number of facilities using old source test methods or order of magnitude methods.

N = No EPA rating available

*EPA overall ratings shown were assigned for the CATEF project and are not official EPA ratings.

This information is from the CATEF Database (accessed on-line on May 29, 2007).
Values represent reciprocating Internal Combustion Engines, fuel is natural gas, SCC code is 20200202, SIC code is 1311, Lean/4S/>650 Hp.

SOURCE ID	CAS	SUBSTANCE	MAXIMUM (lbs/MMcf)	MEAN (lbs/MMcf)	MEDIAN (lbs/MMcf)	Method Rating	Pop Rating	ARB Rating	EPA Rating	# Sources	RSD, %	Uncert, %	Det ratio
3458	106-99-0	1,3-Butadiene	4.15E-01	3.67E-01	3.78E-01	A	3	A3-v0	D	2	14.65	15.37	1
3459	83-32-9	Acenaphthene	2.17E-04	1.51E-04	1.56E-04	A	3	A3-v0	E	2	33.63	35.29	1
3460	208-96-8	Acenaphthylene	7.35E-04	5.25E-04	5.16E-04	A	3	A3-v0	E	2	23.88	25.06	1
3461	75-07-0	Acetaldehyde	2.62E+00	5.29E-01	3.92E-02	A	3	A3-v2	D	2	196.36	206.07	0.96
3462	75-07-0	Acetaldehyde	2.62E+00	5.29E-01	3.92E-02	A	3	A3-v2	NR	2	196.36	206.07	0.96
3463	107-02-8	Acrolein	1.61E-01	5.90E-02	3.92E-02	A	3	A3-v1	C	2	88.08	92.43	0.45
3464	107-02-8	Acrolein	1.61E-01	5.90E-02	3.92E-02	A	3	A3-v1	D	2	88.08	92.43	0.45
3465	107-02-8	Acrolein	1.61E-01	5.90E-02	3.92E-02	A	3	A3-v1	NR	2	88.08	92.43	0.45
3466	120-12-7	Anthracene	1.71E-04	1.19E-04	1.13E-04	A	3	A3-v0	E	2	32.95	34.58	1
3467	71-43-2	Benzene	2.59E-01	2.18E-01	2.12E-01	C	3	C3-v0	A	2	12.23	12.83	1
3468	71-43-2	Benzene	2.59E-01	2.18E-01	2.12E-01	C	3	C3-v0	C	2	12.23	12.83	1
3469	71-43-2	Benzene	2.59E-01	2.18E-01	2.12E-01	C	3	C3-v0	D	2	12.23	12.83	1
3470	56-55-6	Benzo(a)anthracene	9.92E-05	5.88E-05	5.03E-05	A	3	A3-v0	E	2	56.36	59.14	1
3471	50-32-8	Benzo(a)pyrene	3.88E-06	2.70E-06	2.52E-06	A	3	A3-v0	E	2	35.83	37.6	0
3472	205-99-2	Benzo(b)fluoranthene	7.98E-05	4.09E-05	3.49E-05	A	3	A3-v1	E	2	56.71	59.51	1
3473	191-24-2	Benzo(g,h,i)perylene	1.71E-05	7.54E-06	6.81E-06	A	3	A3-v1	E	2	80.22	84.19	0.92
3474	207-08-9	Benzo(k)fluoranthene	1.21E-05	7.83E-06	8.54E-06	A	3	A3-v0	E	2	45.21	47.44	0.93
3475	218-01-9	Chrysene	2.25E-05	1.43E-05	1.58E-05	A	3	A3-v1	E	2	50.42	52.91	0.96
3476	53-70-3	Dibenz(a,h)anthracene	3.88E-06	2.70E-06	2.52E-06	A	3	A3-v0	E	2	35.83	37.6	0
3477	100-41-4	Ethylbenzene	1.15E-01	7.11E-02	7.00E-02	C	3	C3-v0	D	2	50.37	52.86	1
3478	206-44-0	Fluoranthene	4.57E-04	2.91E-04	2.99E-04	A	3	A3-v0	E	2	50.1	52.58	1
3479	86-73-7	Fluorene	7.98E-04	4.36E-04	3.49E-04	A	3	A3-v0	E	2	58.05	60.92	1
3480	50-00-0	Formaldehyde	2.09E+01	4.71E+00	3.65E-01	B	2	B2-v3	C	3	157.78	121.28	0.97
3481	50-00-0	Formaldehyde	2.09E+01	4.71E+00	3.65E-01	B	2	B2-v3	E	3	157.78	121.28	0.97
3482	50-00-0	Formaldehyde	2.09E+01	4.71E+00	3.65E-01	B	2	B2-v3	NR	3	157.78	121.28	0.97
3483	193-39-5	Indeno(123-cd)pyren	1.09E-05	7.17E-06	8.06E-06	A	3	A3-v1	E	2	43.57	45.72	0.96
3484	91-20-3	Naphthalene	3.10E-02	2.51E-02	2.34E-02	A	3	A3-v0	E	2	18.15	19.05	1
3485	85-01-8	Phenanthrene	2.75E-03	1.85E-03	1.80E-03	A	3	A3-v0	E	2	37.16	39	1
3486	115-07-1	Propylene	1.21E+01	5.38E+00	4.25E+00	C	3	C3-v0	A	2	61.42	64.46	1
3487	115-07-1	Propylene	1.21E+01	5.38E+00	4.25E+00	C	3	C3-v0	D	2	61.42	64.46	1
3488	129-00-0	Pyrene	3.26E-04	1.87E-04	1.91E-04	A	3	A3-v0	E	2	49.82	52.28	1
3489	108-88-3	Toluene	3.94E-01	2.39E-01	2.59E-01	C	3	C3-v0	A	2	46.93	49.25	1
3490	108-88-3	Toluene	3.94E-01	2.39E-01	2.59E-01	C	3	C3-v0	D	2	46.93	49.25	1
3491	1330-20-7	Xylene (Total)	9.65E-01	6.46E-01	6.85E-01	C	3	C3-v0	D	2	45.98	48.25	1

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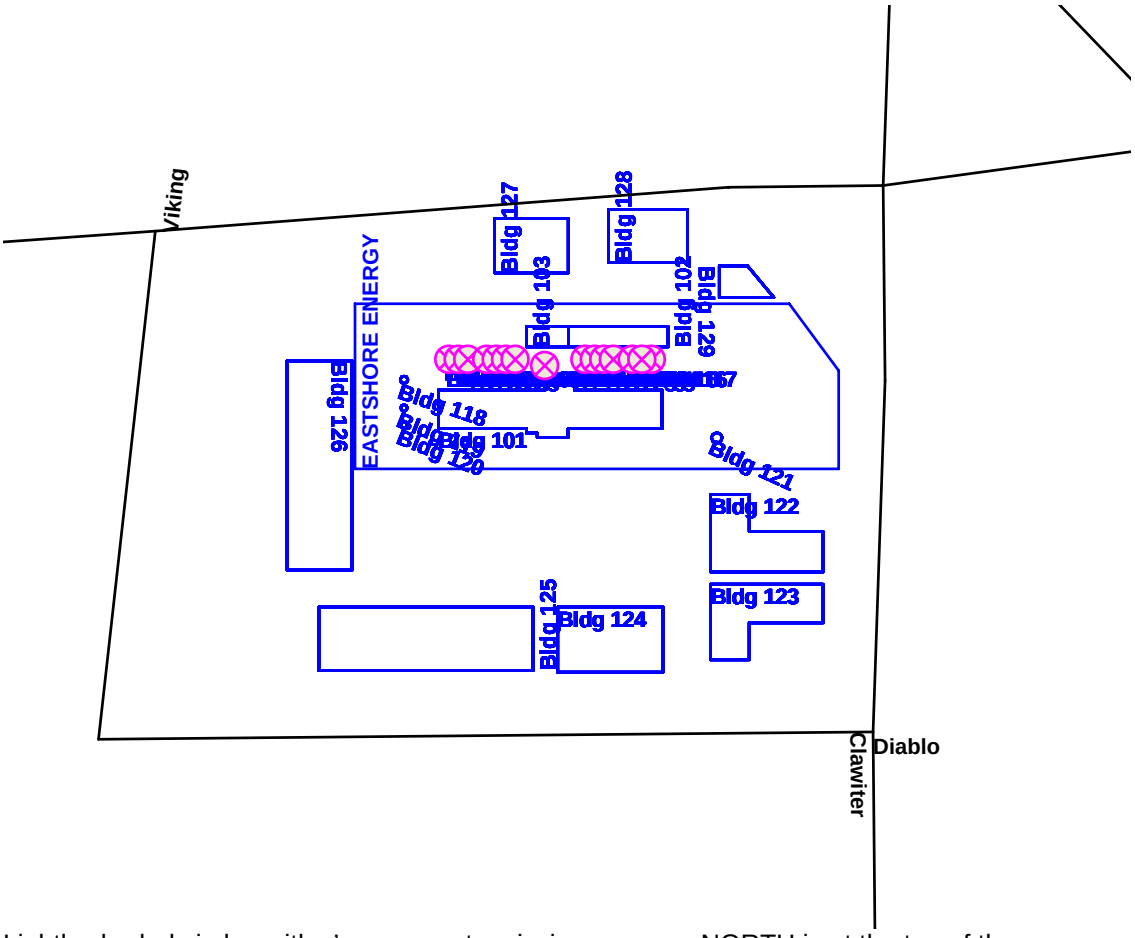
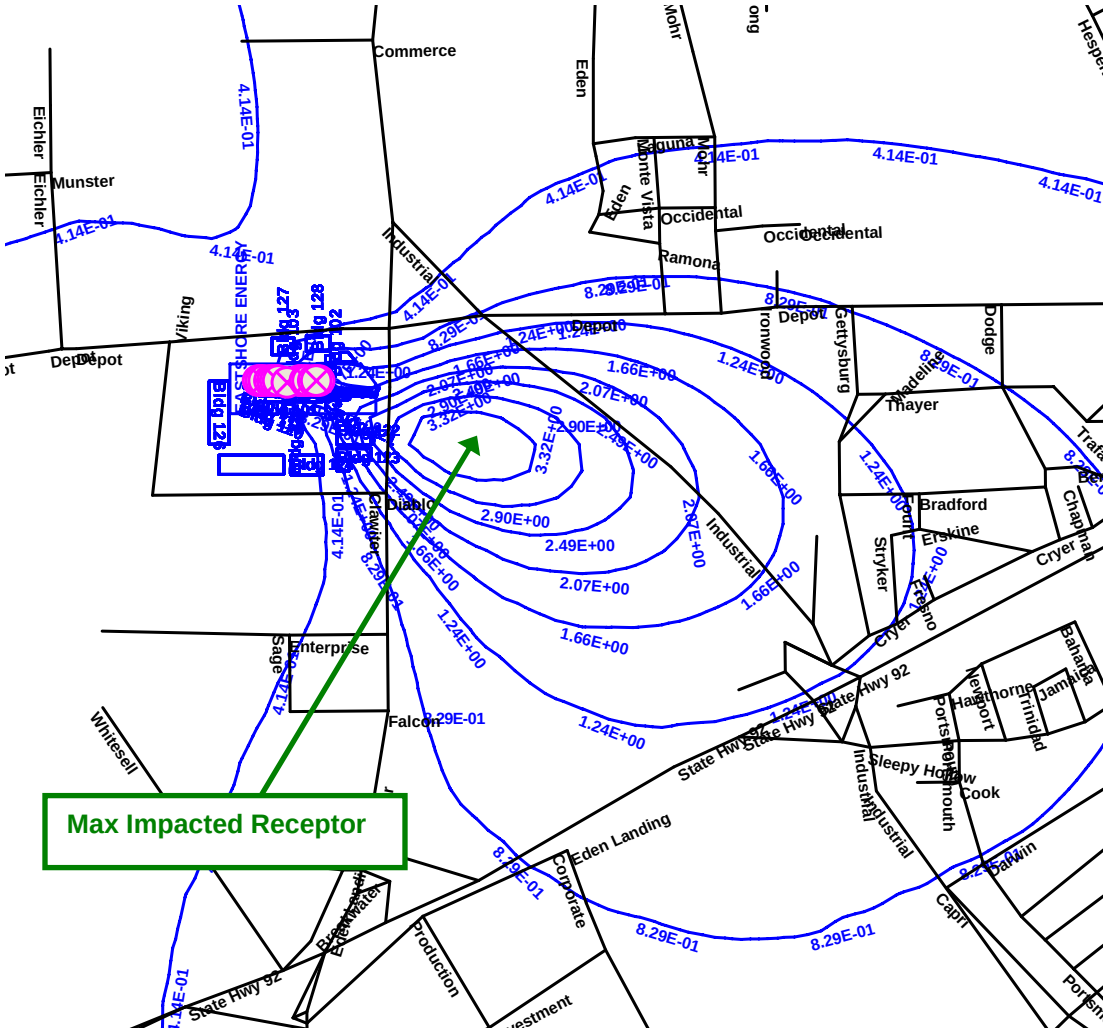
PUBLIC HEALTH Figure 1
Eastshore Energy Center: Facility fenceline, buildings and stacks



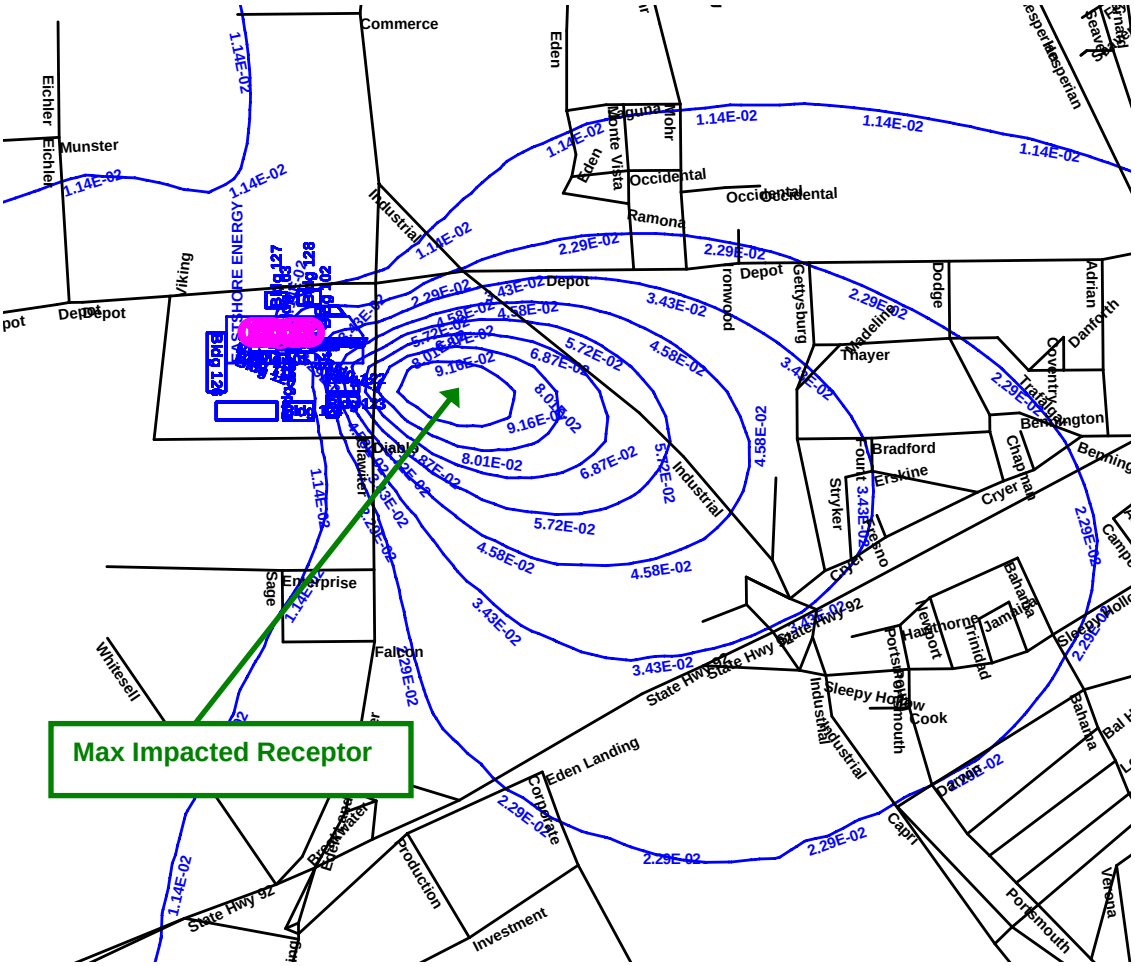
Lightly shaded circles with x's represent emission sources. NORTH is at the top of the page.

PUBLIC HEALTH Figure 2
Eastshore Energy Center: Cancer risk isopleths *

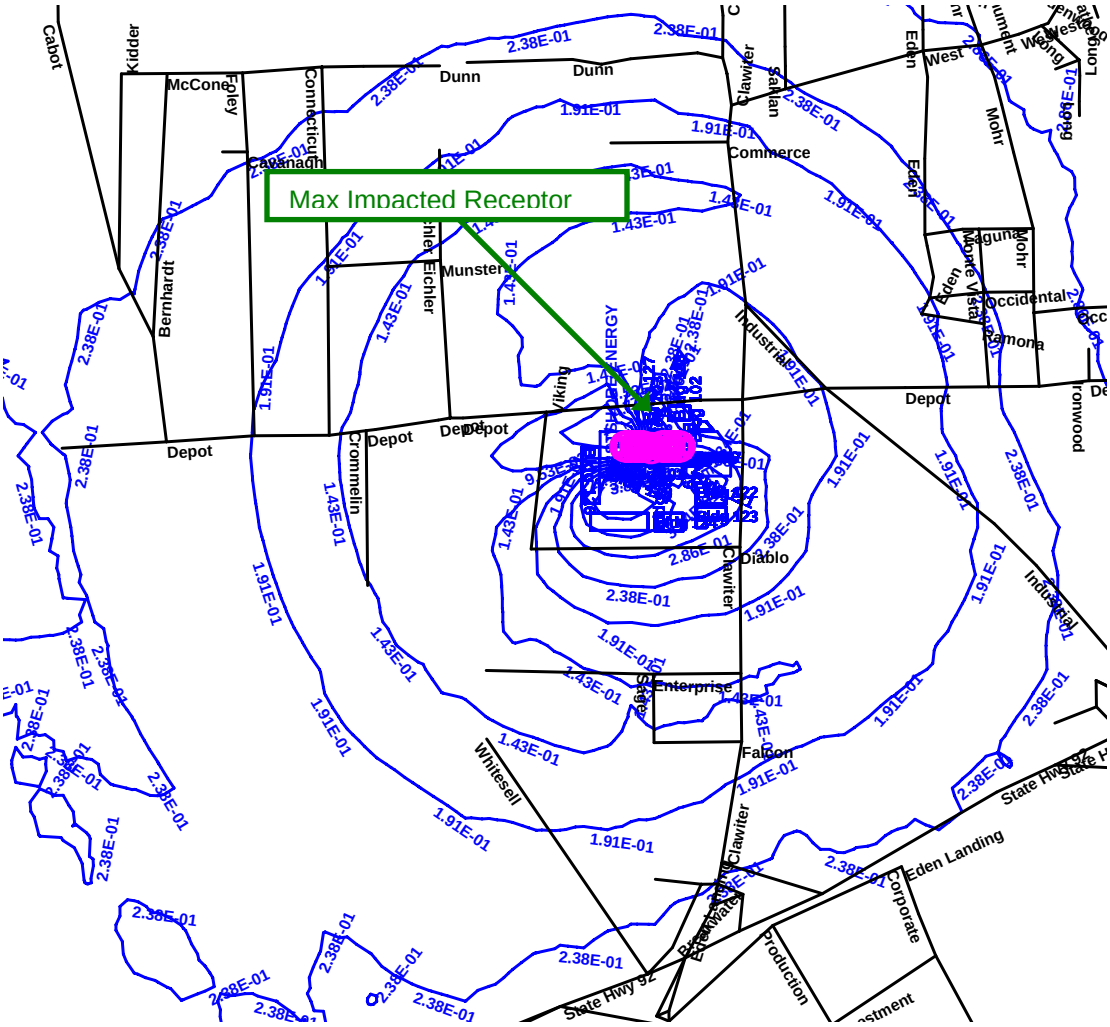


* Note that the cancer risk isopleths shown are the risk value “in a million.”

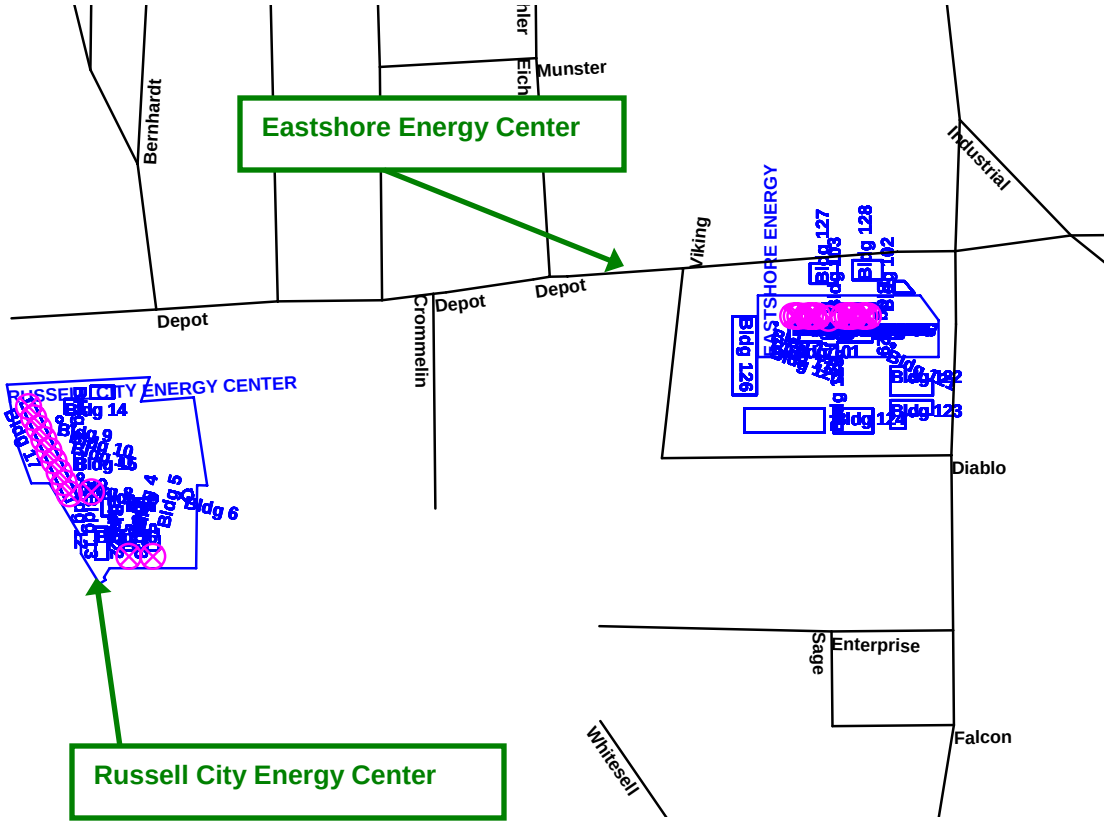
PUBLIC HEALTH Figure 3
Eastshore Energy Center: Chronic hazard isopleths



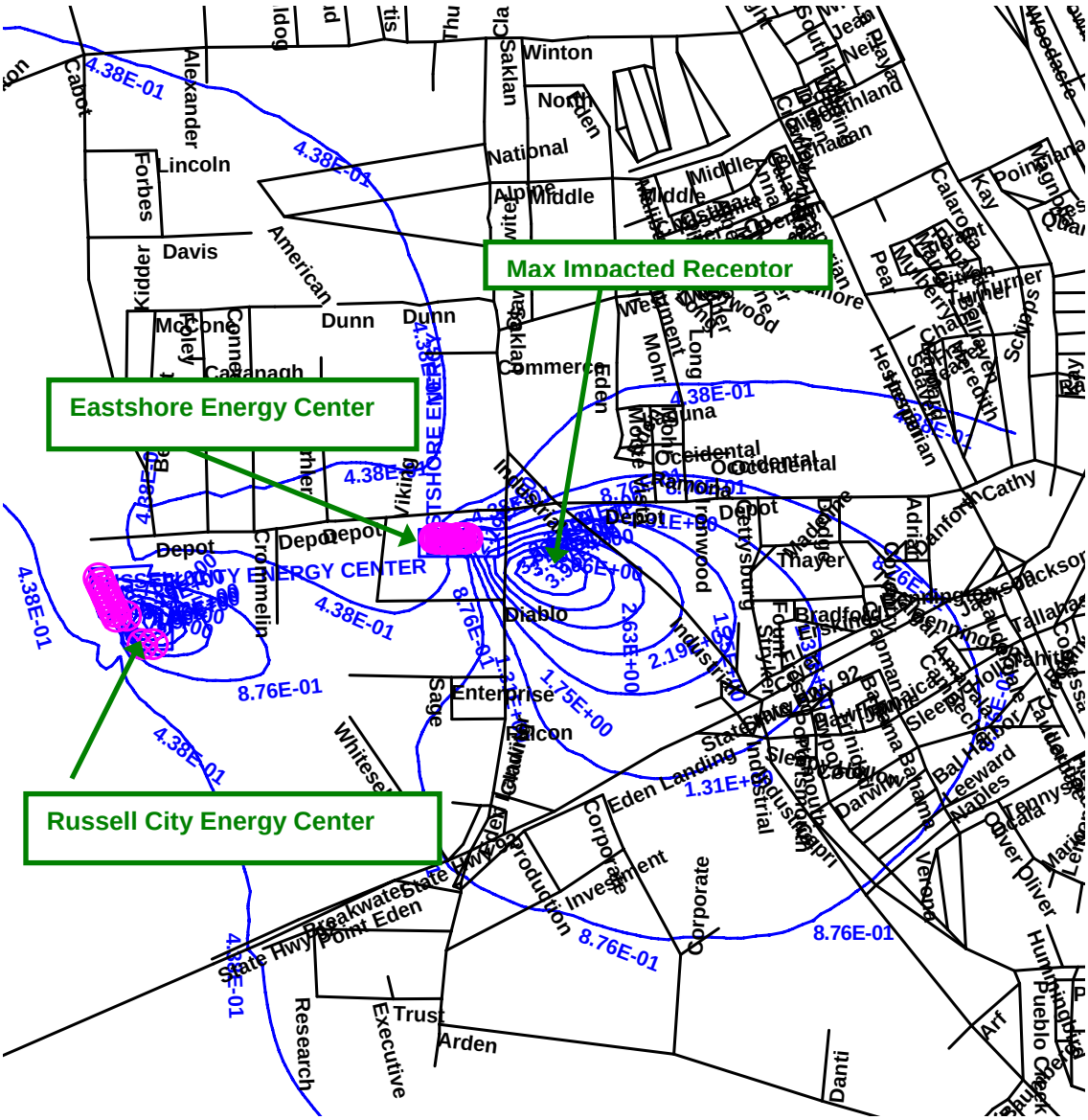
PUBLIC HEALTH Figure 4
Eastshore Energy Center: Acute hazard isopleths



PUBLIC HEALTH Figure 5
Russell City Energy Center and Eastshore Energy Center

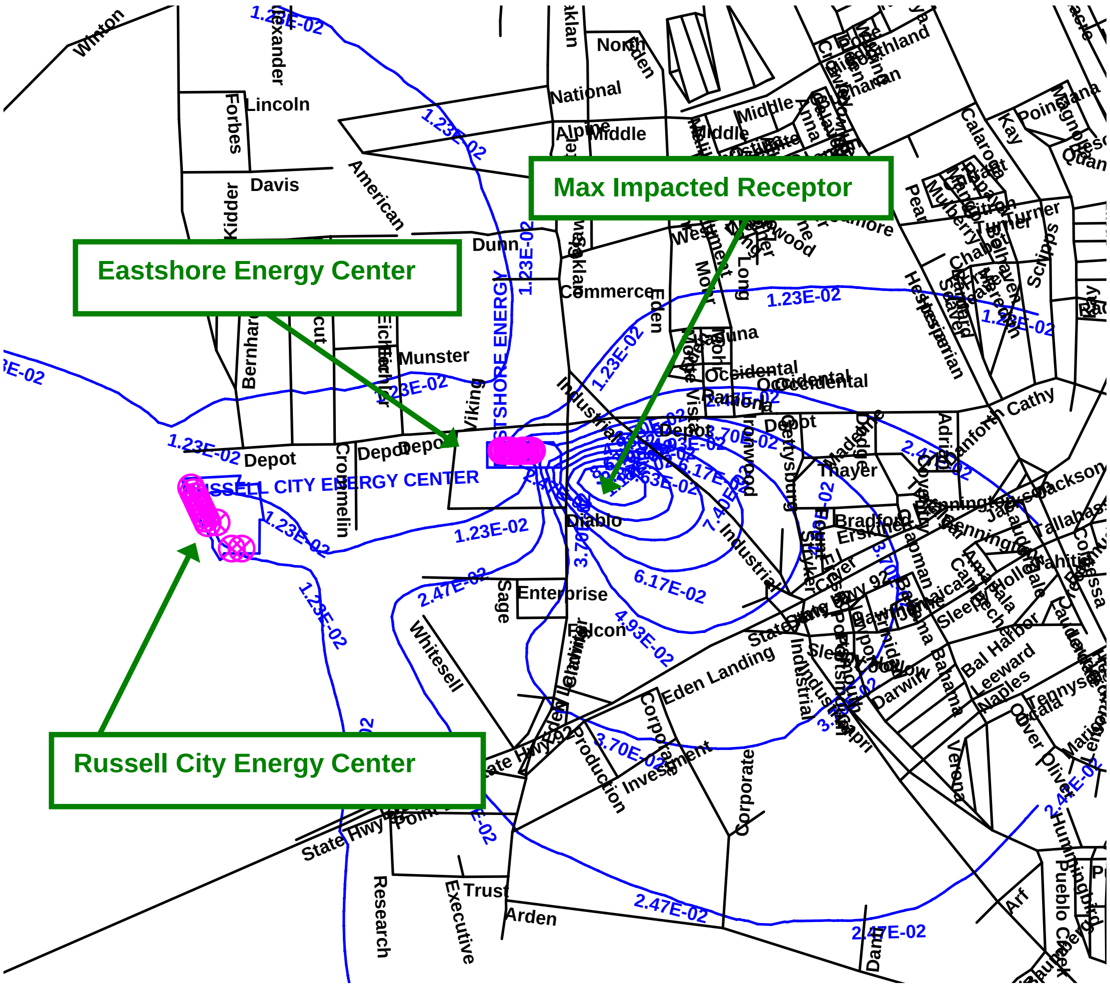


PUBLIC HEALTH Figure 6
Cumulative cancer risk isopleths*

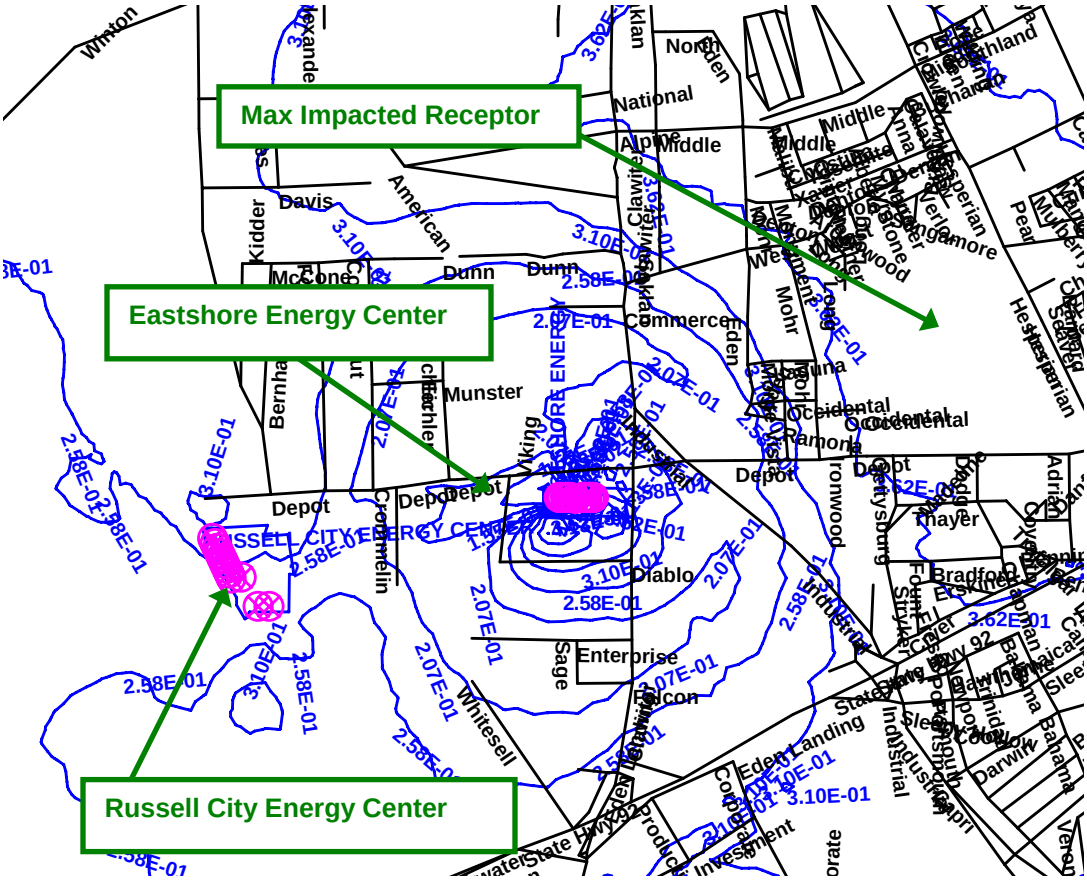


* Note that the cancer risk isopleths shown are the risk value "in a million."

PUBLIC HEALTH Figure 7
Cumulative chronic hazard isopleths



PUBLIC HEALTH Figure 8
Cumulative acute hazard isopleths



SOCIOECONOMICS

Testimony of Joseph Diamond Ph.D.

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff has determined that the 115.5 MW Eastshore Energy Center (Eastshore) Project would not cause a significant adverse direct or cumulative socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and parks and recreation. Public benefits from the project include capital costs, construction and operation payroll, and property taxes and sales taxes.

INTRODUCTION

This Energy Commission staff socioeconomics impact analysis evaluates the project-induced changes on community services and/or infrastructure, and related community issues such as environmental justice (EJ). Staff discusses the estimated impacts of construction and operations of the Eastshore facility.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

SOCIOECONOMICS Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	These sections include provisions for school district levies against development projects. As Amended by Senate Bill (SB) 50 (Stats. 1998, ch. 407, sec. 23), these sections state that except for those fees established under Education Code 17620, public agencies at the state and local level may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

The proposed Eastshore facility would be located at 25101 Clawiter Road in the City of Hayward, Alameda County, on a 6.22-acre parcel owned by Eastshore Energy, LLC, the project owner.

Research shows that construction workers will commute as many as two hours one way from their respective communities rather than relocate (Electric Power Research Institute 1982). As discussed in the Application For Certification (AFC), most construction workers would likely be drawn from the Oakland Metropolitan Statistical Area (MSA) - Alameda and Contra Costa counties - and other Bay Area counties. These workers are largely within a two-hour commute of the Eastshore site. If non-local workers (those outside a two-hour commute range of the site) are required for the project, they might choose to relocate to hotels and motels during construction, and return home for the weekends (EEC 2006a). Therefore, staff utilized these labor market areas for both its evaluation of construction worker availability and community services and infrastructure impacts from the Eastshore project's construction.

Alameda County was used as the study area by staff in identifying fiscal and non-fiscal (private sector) benefits and other potential socioeconomic impacts from the Eastshore project.

DEMOGRAPHIC SCREENING

The purpose of an environmental justice screening analysis is to determine whether a below-poverty level and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the demographic screening in accordance with the *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis* (guidance document) (USEPA 1998). People-of-color populations, as defined by this guidance document, are identified where either:

- The minority population of the affected area is greater than 50 percent of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis;
- One or more census blocks in the affected area has a minority population greater than 50 percent.

In 1997, the President's Council on Environmental Quality issued environmental justice guidance that defines "minority" as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black (not of Hispanic origin); or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population reports, series P-60 on income and poverty (OMB 1978).

Staff has reviewed Census 2000 information that shows the minority population by census block (the smallest geographic unit for which the Census Bureau collects and tabulates data) is 63.71 percent and 69.97 percent within a six-mile and one-mile radius of the proposed Eastshore project (See **Socioeconomics Figure 1**). Census 2000 by census block group (a combination of census blocks and a subdivision of a census tract) information shows that the below-poverty population is 8.33 percent within the six-mile radius and 7.21 percent within the one-mile radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

ASSESSMENT OF IMPACTS

Staff reviewed the Eastshore project's socioeconomic section of the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations, and its own independent analysis to form the following socioeconomic analysis and conclusions.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) guidelines, a project may have a significant effect on population, housing, and public services if the project will:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for fire and police protection, schools, parks, and other public facilities.

A socioeconomic analysis looks at beneficial impacts on local finances from property and sales taxes as well as potential adverse impacts on public services. In order to determine if a project would have any significant impacts, staff analyzes whether the current status of these community services and capacities can absorb the project-related impacts in each of these areas. If the project's impacts could appreciably strain or degrade these services, staff considers this to be a significant adverse impact and would propose mitigation. A project's property taxes, sales tax, or local school impact or development fees can help local governments augment their needed public services.

In this analysis staff used fixed percentage criteria for environmental justice in evaluating its potential impacts. For environmental justice, staff uses a threshold of greater than 50 percent for minority/below-poverty population as a subset of the total population in the local area. Significance criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **Soil and Water Resources**, **Reliability**, **Worker Safety and Fire Protection**, and **Waste Management** sections of this Final Staff Assessment (FSA). Impacts on housing, schools, parks and recreation, medical services, law enforcement, and cumulative impacts are based upon either subjective judgments or input from local and state agencies. Substantial employment of people who come from regions outside the study area has the potential to cause significant adverse socioeconomic impacts.

DIRECT/INDIRECT/INDUCED IMPACTS

Population and Employment

The 2000 U.S. Census shows that California had a total population of 33,871,648, with minority (non-white and white Hispanic) population of 18,054,858 (53.3 percent) and a white population of 15,816,790 or (46.7 percent). Alameda County had a total population of 1,443,741 (California Department of Finance 2006). By 2010, projections show a California population of 39,246,800, with 1,651,200 residents in Alameda County (EEC 2006a).

The unemployment rate for Alameda County was 4.7 percent in August 2006 (not seasonally adjusted). This is not quite full employment for Alameda County. Full employment has been defined as 4 to 5 percent unemployment over the last few decades. For California, the unemployment rate was 4.9 percent (State of California 2006).

There were 59,660 annual average construction and extraction workers in the Oakland Metropolitan Statistical Area (MSA) (Alameda and Contra Costa counties) in 2002 (CAEDD 2006). These workers are largely within a two- hour commute of the project site. **Socioeconomics Table 2** shows that total labor, by skill, in the Oakland MSA, with annual averages for 2002 and a projection for 2012, is large when compared with the Eastshore facility's needs. The applicant surveyed similar Employment Development Department (EDD) labor force information with the Building and Construction Trades Council of Alameda County and concluded that the workforce of Alameda County alone was sufficient to meet Eastshore facility labor requirements (EEC 2006a). The peak construction activity (235 workers) for the facility represents less than one percent of the total workforce.

SOCIOECONOMICS Table 2
Available Labor in Oakland MSA by Skill for Construction and Operations

Occupational Title	Annual Averages 2002	2012	Maximum Needed per Month by EEC
Grading and excavators operator	N/AV	N/AV	5
Equipment operating engineers (power plant operators)	3,370	3,510	7
Teamsters (truck drivers)	17,540	18,770	9
Surveyors	920	1,030	3
Foreman and supervisors/managers	6,840	7,440	9
Ironworkers (structural iron and steel workers)	1,410	1,550	15
Steel fitters (reinforcing iron and rebar workers)	620	690	15
Welders	N/AV	N/AV	8
Sheetmetal workers	1,430	1,560	4
Roofers	1,660	1,810	5
Electricians	4,960	5,220	30
Electrical journeyman (helpers)	350	340	22
Laborers (construction)	11,870	13,430	30
Plumbers/pipefitters/steamfitters	3,190	3,290	33**
Riggers	N/AV	N/AV	8
Millwrights	430	460	26
Carpenters	10,610	12,290	5
Bricklayers	350	400	8
Cement finishers	1,060	1,240	3
Painters (construction and maintenance)	3,560	4,030	10
Insulators	270	300	12
Plasterers (and stucco masons)	870	980	3
Sprinklerfitters	N/AV	N/AV	2
Plant operating engineers (power plant operators)	410	420	15
Start-up engineers	N/AV	N/AV	8
Genset OEM team members	N/AV	N/AV	15
Manual (workers)	N/AV	N/AV	10
Non-manual (workers)	N/AV	N/AV	7

Source: EEC 2006a and State of California EDD 2007.
* Not available (N/AV) ** Pipefitters and steamfitters only

While it is anticipated that there is an adequate labor force to construct the Eastshore facility from, first Alameda County or the Oakland MSA, the applicant has stated in a more conservative scenario that the construction workforce would come mostly from Alameda (60 percent) and Contra Costa counties but also from other counties in the Bay Area if necessary. Much of the Bay Area is within a two-hour commute of the Eastshore site. If construction workers are required from areas outside the two-hour

commute range, they would likely commute to the project site on a workweek basis. (EEC 2006a).

Project construction (power generation facility, including the natural gas pipeline and electric transmission line) and demolition of a vacant industrial building is expected to occur over an 18-month period (EEC 2006a and COH 2006a). The greatest number of construction workers (peak) would occur in the eleventh month of construction. The number of construction workers would range from about 31 in the last month of construction to 235 workers at peak construction. There would be an average of 125 workers per month during construction.

The operations workforce would likely come entirely from Alameda County. During the operation of the project, about 13 workers would be needed to maintain and operate the project (EEC 2006a). Staff estimates that this small increase in employment would have little effect on local employment rates.

The Impact Analysis for Planning (IMPLAN) model (an input-output model), used by the applicant to estimate employment impacts from the Eastshore facility on the study area, is acceptable to staff. The University of California, Berkeley, uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. IMPLAN is a disaggregated type of model that divides the regional economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). Social Accounting Matrix (SAM)[3] multipliers were used for the applicant's economic impact analysis. SAM multipliers are similar to Type II[4] multipliers because each includes indirect and induced effects (secondary impacts).

Total construction employment is estimated at 232 total jobs (107 secondary jobs), based upon an average of 125 project-related construction jobs. The Eastshore facility's construction income of $14,786,700 would result in secondary impacts of approximately $4,561,500 and total impacts of approximately $19,348,000. The construction employment multiplier as reported by the applicant is approximately 1.9 and the operation multiplier is approximately 1.2.

For operations, 13 direct operations jobs and 11 jobs as secondary impacts yield an estimated 24 total jobs. $2,366,100 in annual operation income yield a secondary impact of approximately $531,200 and total income impacts of approximately $2,897,300. So the operations employment multiplier as reported by the applicant is approximately 1.9 and the operations income multiplier is approximately 1.5 (EEC 2006a).

Staff finds the economic impact analysis reasonably consistent with the economic literature benchmarks cited by many economists with multipliers of 2 to 2.5 in the long

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[3] Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting.

[4] A Type I multiplier is the ratio of the direct plus indirect change to the direct change resulting from a unit increase in final demand for any given sector. A Type II multiplier is the ratio of the direct, indirect, and induced change to the direct change resulting from a unit increase in final demand. The Type II multiplier takes into account the Eastshore repercussionary effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects (Richardson 1972). Both multipliers can be of an income or employment type. Indirect changes are production changes in industries supplying the original industry (backward linkages). Induced changes are changes in regional household spending levels caused by regional employment impacts.

run (Moss et al. 1994) and SAM total effects multipliers, which usually range from 1.5 to 2.5 (Mulkey et al. 2000).

Fiscal and Non-Fiscal Effects

Some fiscal (having to do with the public treasury) impacts (all dollars are 2006) of the Eastshore facility includes:

- Property taxes: $1.4 million annually;
- Construction total local sales tax: $166,250 for the 18-month construction period, $47,500 to Alameda County;
- Operation sales tax: $116,480 annually; and
- School impact fee: $13,776 (EEC 2006a).

Non-fiscal (private sector) impacts (all in 2006 dollars) of the Eastshore facility include:

- Total capital costs, estimated at $140 million;
- Construction payroll of $33.8 million over 18 months, with operations payroll of approximately $1 million;
- Approximately $1.9 million would be spent locally on construction materials and supplies and $1,331,200 for each year of facility operation for locally purchased materials as part of an operation and maintenance budget in Alameda County (EEC 2006a).

Housing

As of January 1, 2006, there were approximately 562,479 housing units in Alameda County. The vacancy rate for this housing averages approximately 3.01 percent for Alameda County, which includes single family, multi-family, and mobile homes. There were 47,861 units in the City of Hayward, with a vacancy rate of 2.4 percent (EEC 2006a). Staff does not expect any construction workers not currently living in the Bay Area to permanently relocate as a result of the project.

For workers who come from outside the two-hour commute area, there is an ample supply of hotel/motels in Alameda County. There are 30 hotel/motels with approximately 150 rooms within approximately 10 miles of the project site, enough to accommodate construction workers who would commute on a work-week basis (EEC 2006a). The Hayward Chamber of Commerce had no specific information on hotel/motel occupancy except that the vacancy rate was not as high as it once was (CEC 2006a). Also, there are 32,000 hotel rooms in the City of San Francisco with an average vacancy rate of 30 percent (Adams 2006).

Again, the majority of the construction workforce is expected to commute daily from Alameda and Contra Costa counties and other Bay Area counties (EEC 2006a). Staff concludes that the supply of available permanent and temporary housing is sufficient to accommodate any construction workers commuting weekly to the work site on a short-term basis. Staff does not expect any housing to be displaced (moved) as a result of this project.

The entire permanent operational workforce is expected to commute from within Alameda County (EEC 2006a).

Staff concludes that there would be no significant adverse socioeconomic impacts on housing resources from the Eastshore project.

Schools

Alameda County has 21 elementary, high school, and unified school districts. The Eastshore project is within the boundaries of the Hayward Unified School District which showed an 11 percent decrease in enrollment from the 2004-2005 school year to the projected enrollment for the 2006-2007 school year. For the three schools serving the project site, Eden Gardens Elementary School, Ochoa Middle School, and Mt. Eden High School, enrollment from 2004-2005 to projected enrollment for 2006-2007 will see a 17 percent decline (EEC 2006a).

During construction, most workers would commute to the site from their homes in Alameda and Contra Costa counties and other counties in the Bay Area. Other workers would commute on a work-week basis, returning to their families on the weekend. Staff would therefore expect any increase in the demand for educational services to be minimal (EEC 2006a).

Thirteen operation workers are expected to be hired for the Eastshore facility from the Alameda County labor force (EEC 2006a). Since all employees are expected to be hired from Alameda County and are expected to commute, there should be no significant adverse socioeconomic impacts on local schools.

Education Code section 17620 authorizes a school district to levy a fee against any construction within a district. State and local agencies are precluded from imposing additional fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools. Local school impact fees to the Hayward Unified School District are estimated to be $13,776 (EEC 2006a). Staff has proposed condition of certification **SOCIO-1** to ensure payment of this one-time school impact fee and compliance with LORS. This reflects the policy of the Hayward Unified School District to require payment of the school impact fee first in order to get a building permit from the City or County i.e., before construction not 30 days before operation (Gebala 2007).

There are no significant adverse socioeconomic impacts on educational resources from the facility.

Law Enforcement

The Eastshore project is within the jurisdiction of the Hayward Police Department (HPD), which is in the City of Hayward at 300 West Winton Avenue. The HPD has 200 full-time sworn officers and there is a three-minute response time from the HPD to the project site. The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads.

The Eastshore facility should not create a significant impact (criminal activity, traffic, or crowd control) on law enforcement, from a population perspective, since most of the

construction labor force would commute. For the operation phase, the change in population is minimal (the operations labor force is small, 13 and local) so the impact on law enforcement should be small (EEC 2006a).

The applicant notes that the HPD was unable to confirm if, during the construction and operation phases, impacts on law enforcement would be minimal (EEC 2006a). Staff notes that the Eastshore facility is not a large power plant, is only 115 MW, and therefore would not require a large construction or operational workforce. Power plants also typically have their own security forces. Again, the facility would not need much if any law enforcement assistance under most circumstances. This has been typical for law enforcement in siting cases before the Energy Commission. There are therefore no significant adverse socioeconomic impacts on law enforcement resources from the Eastshore project.

Parks and Recreation

The construction labor force would commute mostly from Alameda and Contra Costa counties and if necessary other Bay Area counties. Construction workers might commute on a work-week basis if coming from outside the two-hour commuting range to the site, staying in hotels/motels. The operation workforce is small and would be from Alameda County. Therefore, staff concludes that there would be no significant adverse socioeconomic impact on parks and recreation.

Medical Services

Three hospitals are available to serve the project site. St. Rose Hospital in Hayward has 175 beds and is about two miles from the project site. Kaiser Hayward Medical Center, in Hayward, has 275 beds and also is two miles from the site. Staff estimates that the response time would be approximately five minutes or less to the St. Rose and Kaiser Hayward hospitals. Both hospitals provide emergency medical services. Finally, 21 miles away is Alameda County Medical Center with 475 beds (EEC 2006a). Staff concludes that the medical services are adequate for the Eastshore project's construction and operation. There are no significant socioeconomic impacts that might trigger adverse physical impacts in the provision of medical services since medical services are adequate to serve the facility.

Property Values

Some Hayward residents have asked if property values would fall as a result of the Eastshore Project. Energy Commission research on the nexus of power plants and property values indicate that:

- Energy facilities are often located in areas with multiple factors that affect property values (such as degraded industrial views, waterfront views, nearby public recreation areas or freeways), which makes it difficult to isolate the potential impact, if any, of the energy facility. (CEC 2003).

- Community members and land developers have expressed concern that proposed energy facilities, such as power plants and electric transmission lines, would reduce the values of property near the facilities. Proximity impacts potentially affecting property values include health hazards and obstruction of views. A number of

studies cite several examples of proximity impacts on residential property values. The findings of these studies are inconclusive. In some cases projects may result in negative economic impacts, while other projects no economic impacts occur (Kinnard, 1995, and California Energy Commission, 1992). Thus, even for very large facilities that have a greater potential for health and safety impacts, there is no clear association with diminished economic impacts to property values (CEC 2005).

The proposed Eastshore Project would be built on 6-acres in an area designated an "Industrial" Zone and "Industrial Corridor" by the City of Hayward. Staff completed a visual resource analysis of the project from seven potential viewpoints (Key Observation Points or KOPs) in the City of Hayward. The chiropractic school across the street from the project site may experience the highest level of visual impact of the seven KOPs reviewed; this impact is not considered significant under the California Environmental Quality Act (CEQA) with effective implementation of mitigation measure(s) identified by the project owner and staff's recommended conditions of certification. In addition, the Air Quality, Noise and Vibration, and Public Health, sections of the FSA conclude that there are no significant adverse impacts with appropriate mitigation measures. The Land Use and Traffic and Transportation sections of the FSA identify unmitigated impacts to aircraft flight patterns and operations and the utility of Hayward Executive Airport. As such, these impacts would not have a negative impact on residential property values in the project study area. For a more detailed discussion on the visual resources, air quality, noise and vibration, public health, and traffic assessments, see the **Visual Resources, Air Quality, Noise and Vibration, Public Health, Land Use, and Traffic and Transportation** sections of this FSA. On September 26, 2007 the California Energy Commission decided that the Russell City Energy Center (RCEC) (Amendment #1), also in Hayward, would not have a significant effect on the environment (California Energy Commission 2007).

Home prices in Alameda County are expected to rise between one and three percent above the rate of general inflation from 2002 to 2020 (http://www.dot.ca.gov/hq/tpp/officies/ote/alameda02.pdf). In Hayward, median house/condo value was $237,300 in 2000 and $531,300 in 2005 or an approximately 25 percent annual increase (http://www/city-data.com/city/Hayward-California.html). More recently, the Hayward median house/condo value was $585,000 in April 2006 and fell to $515,000 in April 2007, a yearly drop of 11.97 percent (East Bay Economic Development Alliance 2007). Also, Ms. Daluddung Ph. D., Hayward Community and Economic Development Director, reported that median single family homes were $585,000 in 2006 and $579,000 in June 2007. She forecast a four percent increase in single family homes in Hayward over the next five years (Daluddung 2007a). Ms. Ann Biddell, a real estate broker in Hayward said real estate was currently (June 2007) at a standstill in Hayward but she expected it to pick-up by the end of the year (Biddell 2007). In short, because the Eastshore Project is expected to be built in an "Industrial" Zone/Corridor with no significant adverse visual, air quality, and noise and vibration, public heath impacts after mitigation and land use, and traffic and transportation unmitigated impacts that would not have negative impacts on property values in the project study area, and a mixed local real estate market forecast, staff does not expect the proposed project to create a significant adverse socioeconomic impact on property values. Other factors such as supply, demand, interest rates, and personal income play the most important role in determining property values.

CUMULATIVE IMPACTS

A project may have a significant adverse impact when its effects are cumulatively considered. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code regs. tit.14, section 15130).

Cumulative impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that can not be met by local labor, which in turn could result in an influx of non-local workers and their dependents.

In addition to the Eastshore facility, other projects planned in Alameda County include:

- The Russell City Energy Center (RCEC) is a 600 MW natural gas power plant which is to be located in Hayward, Alameda County, with construction scheduled to begin in second quarter (April) 2008.
- The I-238 Widening and Rehabilitation Project started in September 2006 and will run to June 2010. Construction is for 3 ½ years. There was no labor force information available (California Department of Highways 2007).
- The Interstate 880/State Route 92 Interchange Reconstruction Project in the City of Hayward, which is scheduled to begin construction in September 2007 and continue for four years. No additional labor force information is available at this time (Woo 2007b).
- The City of Hayward reported 13 residential projects with 1,544 units and 15 large commercial projects issued or pending valued at $53,568,000. There is no construction workforce information available (Daluddung 2007b).

Construction estimates are shown in **Socioeconomics Table 3**. Project construction for the Eastshore facility is expected to occur from March 2008 through August 2009 (a total of 18 months) and is expected to peak at 235 workers in February 2009 (month 11). Project construction for the RCEC is expected to occur from April 2008 through April 2010 (a total of 24 months) and is expected to peak at 650 workers in May 2009 (month 14). The potential cumulative impact would be the overlap of construction periods for both projects for 17 months. However, the combined project workforce of the two projects, on a monthly basis, would peak at 728 workers, which represents about 1.2 percent of the 2002 average annual Oakland MSA construction workforce. Therefore, staff does not expect the Eastshore facility, either by itself or cumulatively with the RCEC, to contribute significantly to a cumulative socioeconomic impact.

SOCIOECONOMICS Table 3
Cumulative Impact Analysis of the Eastshore Facility and Russell City Construction Workforces 2008 to 2009

	Eastshore	Russell City	Total Construction Workforce
2008			
April	64	28	92
May	71	46	117
June	82	76	158
July	85	94	179
August	132	135	267
September	183	171	354
October	216	242	458
November	218	326	544
December	233	297	530
2009			
January	235	277	512
February	211	514	725
March	152	576	728
April	91	600	691
May	77	650	727
June	67	577	644
July	55	605	660
August	31	559	590

Source: EEC 2006a and Russell City Energy Center 2006.

The construction labor force for road construction projects would not be similar to that of a power plant. Many labor crafts such as plant operation engineers, electricians, plumbers, pipefitters, and steamfitters would be in demand for power plant construction but not for road construction. While there is the potential of overlap in the construction categories of truck and tractor operators, laborers, construction equipment operators, and cement masons and concrete finishers, the 2002 average annual Oakland MSA construction workforce of 59,660 is large enough to accommodate all four projects.

Because of the large labor force in the Oakland MSA, the Eastshore facility, both by itself and when combined with other projects including the residential and commercial projects in Hayward, would not significantly contribute to adverse cumulative socioeconomic impacts. No additional mitigation is necessary.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, annual property taxes and sales taxes, and the value of locally purchased construction and operation equipment and materials.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The City of Hayward's comments on the Eastshore facility's AFC cumulative impacts analysis was that an expanded analysis that incorporates the impacts of the proposed Russell City Energy Center should be included since that plant is proposed to be in operation (COH 2007a). Staff has included the Russell City Energy Center in the socioeconomic **Cumulative Impacts** section.

A member of the local public noted that he would move his family out of Hayward and sell their house if the facility is built (PUB 2007j). If a property were sold, someone would likely buy it and join the community so that population would be more or less stable. There would be no displacement of population. Therefore, there would be no significant adverse socioeconomic impacts as a result of the facility. In addition, see the response below which shows there are no significant negative environmental impacts after mitigation on residential property.

At the May 23, 2007 Staff Workshop, the public requested that the socioeconomic section address property values. Staff has provided this information in the **Property Values** section and below.

Some members of the public including local realtors attending the Eastshore Project's PSA Workshop on September 6, 2007 stated that they were concerned that residential housing prices would fall if power plants were constructed. Therefore, they disagreed with staff's PSA finding of no significant negative on socioeconomic property values. Staff has provided information on this point in the Property Values section.

Connie Lirazo-Jordan who attended the SA Workshop wrote that local realtors suggested that when she list her property to sell, which is about 1,200 feet (about ¼ of a mile) from two power plants, she needed to disclose that two power plants were nearby. She believes this would create a negative perception to a potential buyer making the property more difficult to sell and decrease the value of the property. A seller who has actual knowledge must disclose on the Real Estate Transfer Disclosure Statement (TDS) or if mandated in the local option TDS, should the property be adjacent to or zoned to allow an industrial use described in Section 731A of the Code of Civil Procedure, or affected by a nuisance created by such use (State of California Department of Real Estate 2005). Since the Eastshore Projects which is the closest of the two power plants (RCEC being the other) is not adjacent to her home nor a nuisance (there are no significant environmental externalities i.e., significant environmental impacts after mitigation in the areas of Visual Resources, Air Quality, Noise and Vibration, and Public Health; and the Land Use, and Traffic and Transportation unmitigated impacts affect the utility of Hayward Executive Airport not residential property values) she does not have to disclose the two power plants to potential buyers. Her assertion that her residential property values would fall is based on a "belief" or assumption before the future market transaction occurs. Again, staff has provided information on this point in the Property Values section.

CONCLUSIONS

Staff concludes that the construction and operation of the Eastshore facility would not cause either a significant direct or cumulative adverse socioeconomic impact on the study area's housing, schools, parks and recreation, law enforcement, emergency services, and hospitals. There are therefore no socioeconomic environmental justice issues related to this project. The facility, as proposed, is consistent with applicable LORS.

Estimated gross public benefits from the Eastshore facility include increases in property and sales taxes, employment, and income for Alameda County. For example, there are an average estimated 125 direct project-related construction jobs for the 14 months of construction. The facility is estimated to have total capital costs of $140 million. Its construction payroll is an estimated $33.8 million for 18 months, and the operation payroll is $1 million annually. Property taxes are estimated at $1.4 million for the first year, over a project life of 30 years. The estimated total sales and use taxes during construction are $166,250, and during operation the local sales tax is $33,280 annually over the life of the project. An estimated $1.9 million would be spent locally for materials and equipment during construction, and an additional $1.3 million would be spent annually for the operations and maintenance budget.

Finally, the following **Socioeconomics Table 4** provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the Eastshore Project.

SOCIOECONOMICS Table 4
Data and Information

Estimated project capital costs	$140 million
Estimate of locally purchased materials	
Construction	$1.9 million
Operation (operation and maintenance)	$1.3 million per year
Estimated annual property taxes	$1.4 million per year
Estimated school impact fees	$13,776 to the Hayward Unified School District
Estimated direct employment	
Construction (average)	125 jobs (average per month)
Operation	13 jobs
Estimated secondary employment	
Construction	107 jobs (plus 125 average direct jobs, for a total of 232 average construction jobs)
Operation	11 jobs (plus 13 direct jobs for a total of 24 average operation jobs)
Estimated local direct expenditure (payroll, materials, and supplies)	
Construction	$14,786,700
Operation	$2,366,100
Estimated local secondary income	
Construction	$4,561,500 (plus $14,786,700 million local direct construction expenditures for a total of $19,348,000 local construction expenditures)
Operation	$531,200 (plus $2,366,100 local direct operation expenditures for a total of $2,897,300 local operation expenditures)
Estimated payroll	
Construction	Total-$33.8 million, local-$20.3 million (2006 dollars)
Operation	Average: $1,034,900 million per year
Estimated Sales Taxes	
Construction	$166,250 for the 18-month construction period, $47,500 to Alameda County
Operation	$116,480 annually, $33,280 to Alameda County
Existing unemployment rates	Existing – 4.7 percent for Alameda County and 4.9 percent for California in June 2006 (not seasonally adjusted)
Percent minority population (6- mile radius)	63.71 percent
Percent poverty population (6-mile radius)	8.33 percent
Percent minority population (1-mile radius)	69.97 percent
Percent Poverty Population (1-mile radius)	7.21 percent

Table 3 uses 2006 dollars, construction is for 18 months and the project life is planned for 30 years. Economic (non-fiscal and fiscal) impacts and unemployment are for Alameda County unless otherwise specified. The results of the IMPLAN/Input-Output modeling are for Alameda County and show secondary, indirect, and induced impacts, as well as direct impacts. Population is for both a six-mile and one-mile radius from the power plant.

PROPOSED CONDITIONS OF CERTIFICATION

Socio- 1 The project owner shall pay the one-time statutory school development fee to the Hayward Unified School District, as required by Education Code Section 17620.

Verification: At least 30 days prior to start of project construction, the project owner shall provide the Compliance Project Manager proof of payment of the statutory development fee.

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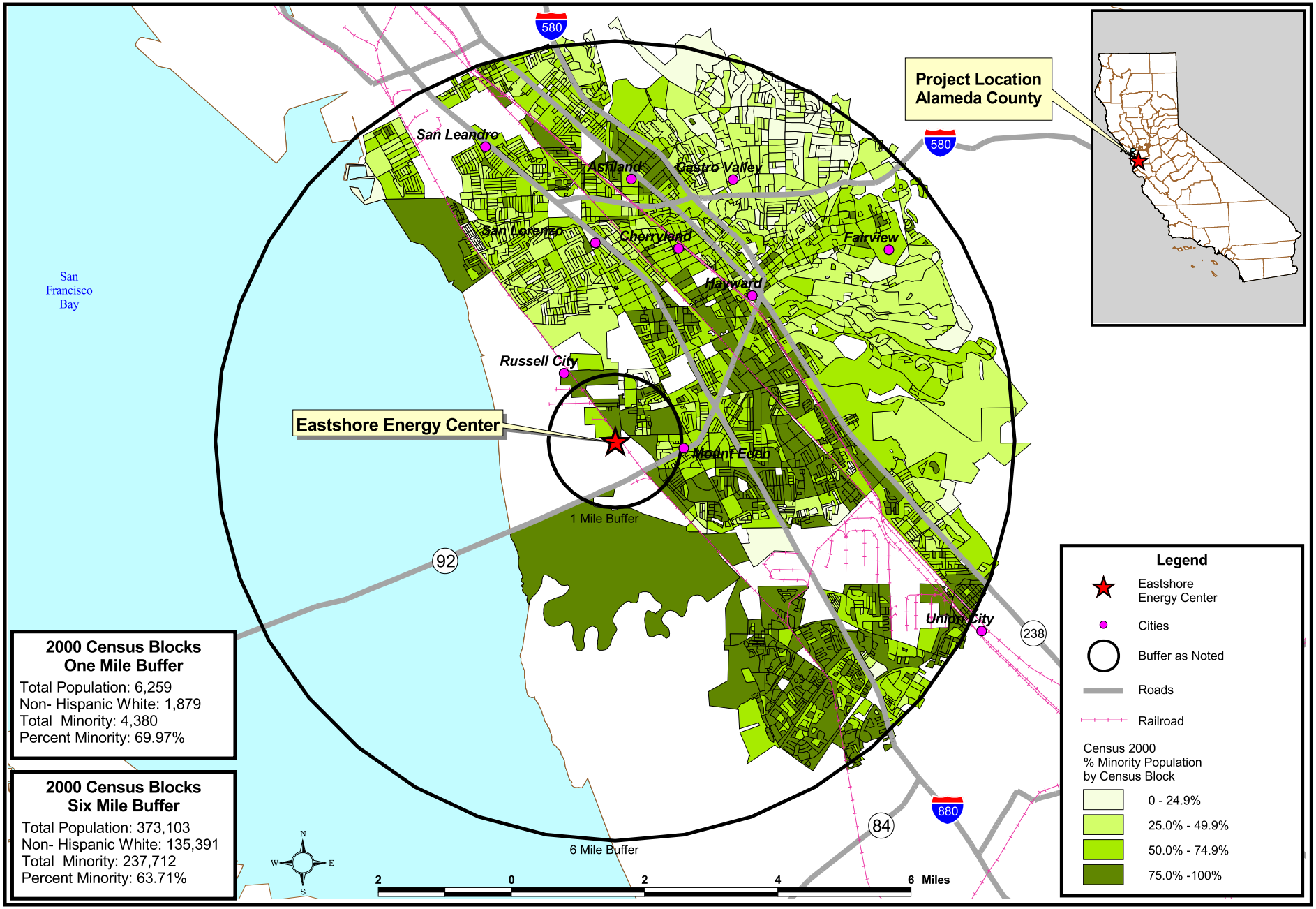
SOCIOECONOMICS - FIGURE 1

Eastshore Energy Center - Census 2000 Minority Population by Census Block - One and Six Mile Buffer

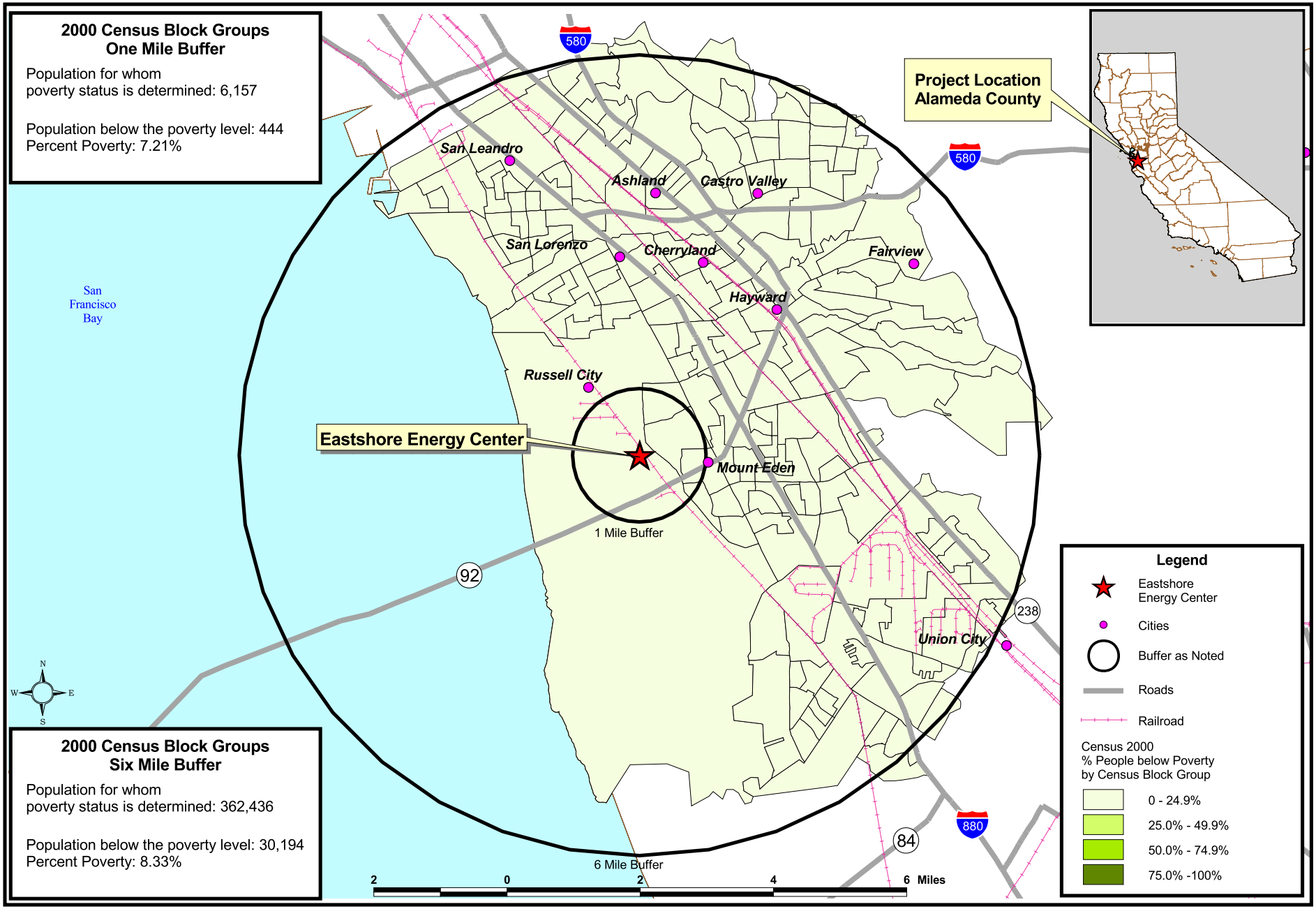


CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2007, Census 2000 PL 94-171 Data - Matrix PL2

SOCIOECONOMICS - FIGURE 2

Eastshore Energy Center - Census 2000 Percentage of People below Poverty by Census Block Group - One and Six Mile Buffer



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2007, Census 2000 SF3

SOIL AND WATER RESOURCES

Testimony of Richard Latteri

SUMMARY OF CONCLUSIONS

Staff has not identified any unmitigated significant impacts to soil and water resources provided that the proposed conditions of certification are met. The proposed Eastshore Energy Center (Eastshore) would comply with all applicable soil and water resource laws, ordinances, regulations, and standards (LORS). Potentially significant impacts would be mitigated through both compliance with various city of Hayward (city) municipal codes and the preparation and implementation of construction and operating plans that address impacts of soil contamination and erosion, surface or groundwater contamination, the use of potable water supplies, and stormwater or wastewater treatment and discharge requirements.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of the potential impacts to soil and water resources caused by the construction and operation of the Eastshore project by Eastshore Energy, LLC (applicant). This assessment incorporates information and comments provided to the Energy Commission staff as of October 2007, and focuses on the following areas of concern:

- whether construction or operation could lead to accelerated wind or water erosion and sedimentation;
- whether the existing soil contamination at the proposed Eastshore site would be addressed in the construction and operation plans to prevent contamination of local water courses or the San Francisco Bay;
- whether the project's potable water consumption would affect surface or groundwater quality and potable water supplies;
- whether the project's wastewater management practices would lead to degradation of surface or groundwater quality;
- whether the project would exacerbate flood conditions in the vicinity of the project due to either construction or operation; and
- whether the project would comply with all applicable laws, ordinances, regulations, and standards.

Where the potential for impacts is identified, staff has proposed mitigation measures to reduce the significance of those impacts as appropriate.

Staff received comments from the applicant on its Preliminary Staff Assessment (PSA) on September 19, 2007 (CH2MHill 2007g). The applicant requests that staff reduce the submittal timeframe for Conditions of Certification **SOIL & WATER-2, 4, and 6** to half the number of days staff needs to review the required reports and agreements. Because Conditions of Certification **SOIL & WATER-2, 4, and 6** are standard conditions that

apply to all power plant owners, staff has not changed the submittal timeframes contained in Conditions of Certification **SOIL & WATER-2, 4, and 6**.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOIL AND WATER Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 USC, §§ 1251 et seq.).	The Clean Water Act requires states to set standards to protect water quality, including regulation of storm-water discharges during construction and operation of power plant facilities.
Resource Conservation and Recovery Act (40 CFR Part 260 et seq.)	The Resource Conservation and Recovery Act of 1976 seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
State LORS	
California Water Code Section 13260	Requires filing with the appropriate Regional Water Quality Control; Board (RWQCB) a report of waste discharge for the protection to waters of the state, unless the requirement is waived pursuant to Water Code section 13269.
California Water Code Section 13551	Requires that the water resources of the state be put to beneficial use to the fullest extent to prevent waste, unreasonable use, or unreasonable method of use.
Safe Drinking Water and Toxic Enforcement Act	This act (California Health and Safety Code, section 25249.5 et seq.) prohibits actions that contaminate drinking water with chemicals known to cause cancer or possessing reproductive toxicity.
California Water Code Section 13550	Requires the use of recycled water for industrial purposes subject to recycled water availability and upon a number of criteria including provisions that the quality and quantity of recycled water be suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact down stream users or biological resources.
Local LORS	
Hayward Municipal Code, Chapter 11, Article 2	A Hayward municipal water system ordinance that establishes requirements for permit application and approval for obtaining potable water from the city.
Hayward Municipal Code, Chapter 11, Article 3	A Hayward sanitary sewer system ordinance that establishes requirements for permit application and approval for obtaining sanitary sewer service from the city.
Hayward Municipal Code, Chapter 11, Article 5	A Hayward stormwater management and urban runoff control ordinance that establishes consistency with the requirements of the Federal Clean Water Act and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0029831.
SWRCB Water Quality Order No. 92-08	Requires the SWRCB to regulate industrial stormwater discharge from construction projects affecting areas greater than one acre to protect state waters. Under Order 92-08, the San Francisco Regional Water Quality Control Board (SFRWQCB) will issue NPDES permits for construction activities, based upon an acceptable stormwater pollution prevention plan (SWPPP) submitted by the applicant.
State Policies and Guidance	
California Constitution, Article X, Section 2	This section requires the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use, or unreasonable method of use of water is prohibited.
The Porter-Cologne Water Quality Control Act of 1967, WC Section 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require the RWQCBs to issue waste discharge requirements specifying conditions for protection of water quality standards.
SWRCB Resolution 77-1	Encourages and promotes recycled water use for non-potable purposes.

California Water Code Section 100	Requires the water resources of the state be put to beneficial use to the fullest extent to which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented. The conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare.
California Water Code Section 1254	Specifies the SWRCB, in acting on applications to appropriate water, shall be guided by the overarching policy that domestic use is the highest use and irrigation is the next highest use of water in the state.
Recycling Act of 1991, Water Code 13575 et seq.	States that retail water suppliers, recycled water producers, and wholesalers should promote the substitution of recycled water for potable and imported water in order to maximize the appropriate cost-effective use of recycled water in California.

SETTING

The proposed Eastshore site is located approximately 1.5 miles from the eastern shore of the San Francisco Bay (Bay). The Bay Area lies in the central part of the Coast Ranges' physiographic province of California. The Bay is a northwest-trending structural depression in the Coast Ranges and lies roughly between the San Andreas Fault to the west and the Hayward Fault to the east. The Coast Ranges province is characterized by a northwest-trending series of elongated ranges and narrow valleys. The topography of the proposed Eastshore site is relatively flat and underlain by Quaternary Age sediments. The site is within a highly active seismic region (EEC 2006a, Section 8.15.3).

The proposed Eastshore site is located on the East Bay Plain geomorphic province on the densely populated eastern shore of the Bay. The proposed project is located approximately three miles south of the San Lorenzo Creek, within the San Lorenzo Cone drainage basin. The East Bay Plain consists of about 120 square miles of tidal marshes and alluvial lowlands which encompass the alluvial fans of the San Lorenzo and Alameda creeks, both of which originate in the Diablo Range and flow westward into the Bay (USGS 2002a, CH2MHILL 2007a, Data Response 41).

The alluvial fans of the San Lorenzo and Alameda creeks are located in a structural depression underlying the Bay. Due to the project's location between two fault zones, the underlying geology is complex and changing as a result of the interaction of the strike-slip tectonics of the San Andreas Fault system and the compressional tectonics of the Hayward Fault system. Because the site is within a highly active seismic region and the depth to groundwater is relatively shallow at 12 feet, both the city and the State of California have identified the project site as having a moderate to high potential for soil liquefaction (EEC 2006a, Section 8.15.3.4.3).

The Eastshore site and laydown area are located in a densely developed industrial area of the city. The project site is zoned industrial and currently occupied by a vacant warehouse and parking lot. The *Report of Findings -- Limited Subsurface Investigation,* located in Appendix 8.13B of the Application For Certification (AFC) reports that volatile organic compounds, (VOCs), DDT, and total extractable petroleum carbons - as diesel and hydraulic oil - were found on the existing site. The report recommends that the impacted soil beneath the warehouse be further evaluated when the building is demolished and the concrete removed. The report also noted that groundwater

sampling has not been performed because the soil contamination appears to be localized within the top three feet of soil (CH2MHILL 2007c, Data Response 67).

PROJECT SITE AND VICINITY DESCRIPTION

The proposed Eastshore project is a nominal 118 megawatt (MW) natural gas-fired intermediate/peaking facility located at 25101 Clawiter Road in the city of Hayward, Alameda County, California. The approximately 6.2-acre site is owned by the applicant and currently occupied by a vacant warehouse and parking lot. The warehouse, foundations, and paved surfaces would be removed as part of the Eastshore project's construction. Surrounding land use includes both industrial and commercial uses (CH2MHILL 2007a, Data Response 41).

The proposed 4.7-acre construction laydown area is located directly southeast of the Eastshore site on property owned by Berkeley Farms. This portion of the Berkeley Farms property is currently unpaved and undeveloped. The portions immediately adjacent to the southern boundary of the laydown area are currently used for temporary storage of truck trailers associated with Berkeley Farms operations. A Union Pacific Railroad (UPRR) corridor crosses Clawiter Road just north of the Eastshore site and an abandoned rail spur is located on the northeast end of the site (CH2MHill 2007a, Appendix 8.14B).

Project Description Figure 1 shows the project site plan and linear facilities consisting of the electric transmission line, natural gas supply line, water supply line, and sanitary sewer line. The transmission line would follow existing roadways or railroad rights-of-way (ROW) through urban areas. The potable water supply and sanitary sewer pipeline connections already exist and would be served through existing connections to the city's municipal water and sewer mains in Clawiter Road immediately adjacent to the project site (EEC 2006a, Section 2.2.2).

The project would connect with PG&E's natural gas pipeline, which is approximately 200 feet away from the project site on the opposite side of Clawiter Road. Pacific Gas & Electric Company (PG&E) would interconnect the project by installing a 4-inch diameter pipeline via an underground bore originating at the project site, boring under Clawiter Road and the existing UPRR right-of-way, and connecting -PG&E's existing gas line (EEC 2006a, Section 2.2.2).

As shown on **Project Description Figure 1**, Eastshore would connect with PG&E's electric transmission system at the utility's Eastshore Substation, approximately 1.1-mile south of the project site. The proposed route overcrosses Clawiter Road and runs south along the east side of Clawiter Road before overcrossing State Route 92 (SR-92). This interconnection would consolidate PG&E's distribution line and the new circuit on one set of pole structures (CH2MHILL 2007a, Data Response 41).

SOIL

The local geology is composed of Quaternary Age deposits underlain by bedrock deposits. The Quaternary Age deposits in the project area form a transgressive sequence of alluvial fan and fan-delta strata. The soils of the Eastshore site and laydown area are underlain primarily by Clear Lake clay with a small portion of the

project site underlain by Danville silty clay loam. Both are formed in alluvial basins. Clear Lake clay underlies most of the Eastshore property except for the southeastern corner. The Danville silty clay loam underlies the southeastern corner of the Eastshore project site and the entire laydown area (EEC 2006a, Sections 8.9.3 and 8.15.3.2).

A significant soil characteristic of the clay strata is its high shrink-swell potential. Expansive clay soils have the ability to shrink and swell with wetting and drying. The shrink-swell capacity of expansive soils can result in differential movement beneath foundations. Expansive clays can therefore be unsuitable for use as bearing surfaces for foundations due to their potential to heave or collapse with changing moisture content. The soil types for the Eastshore project are identified in Figure 8.9-1 of the AFC, and the soil mapping unit description and characteristics are identified in Table 8.9-2 of the AFC. Table 8.9-2 summarizes the soil mapping unit descriptions and characteristics (EEC 2006a, Sections 8.9.3.3 and 8.15.3.4.6).

GROUNDWATER

Groundwater underlying the proposed Eastshore site is part of the 77,800-acre East Bay Plain Groundwater Subbasin (EBPS). The EBPS is a northwest-trending alluvial plain bounded on the north by San Pablo Bay and on the south by the Niles Cone Groundwater Basin in southern Alameda County. The EBPS system consists of an alluvial aquifer system consisting of poorly consolidated to unconsolidated lenses of gravel, sand, silt, and clay of the Quaternary Age. The cumulative thickness of the unconsolidated sediments within the subbasin is approximately 1,000 feet (DWR 2004).

Groundwater on the Eastshore site was observed at about 12 feet below ground surface (bgs) (CH2MHill 2007a, Data Response 1). Groundwater below 200 feet bgs contains relatively high concentrations of total dissolved solids, chloride, nitrate, and sulfate; whereas water quality improves below this level with total dissolved solids of less than 450 milligrams per liter (EEC 2006a, Section 8.14.3.2).

SOIL AND GROUNDWATER CONTAMINATION

Soil contamination was found on site during the geotechnical investigations performed by the applicant’s consultant, TRC in 2006. TRC found petroleum hydrocarbons, VOCs (trimethylenzene and xylenes), and pesticides containing DDT compounds in the soil samples. In general, the reported levels of these organic constituents appear to be limited to the near-surface soil (0 to 0.5 fbg). Reported levels of metals are consistent with typical background levels for area soils. The identification and removal of contaminated soil is discussed in the **Waste Management** section of this document. Given the apparent diminishing concentrations with increasing depth, impacts to groundwater associated with these findings are not expected to be significant (EEC 2006a, Appendix 8.13B, Section 5.0).

To determine the extent of polluted groundwater plumes in the area of the Eastshore site, a database search was performed on both the SFBRWQCB and Department of Toxic Substance Control (DTSC) databases. The SFRWQCB database identified several facilities in the immediate area with leaking underground storage tanks (LUST) that could be impacting groundwater in the vicinity of the Eastshore site. On a service station site to the north of the Eastshore site, a LUST was identified. However, the tank

and piping have been removed and there are monitoring wells on site. Groundwater sampling at the monitoring wells located north, up gradient of the Eastshore site and near the northwest corner of the site found that the contaminated groundwater plume is shrinking (CH2MHill 2007c, Data Response 67).

The SFBRWQCB also identifies three other potential contaminated plumes in the area, as well as two known contaminated sites located approximately one mile north of the Eastshore site. It is not known if these sites have impacted the groundwater beneath the Eastshore site.

SURFACE HYDROLOGY

The Eastshore site is located within the San Lorenzo Cone drainage basin. The basin drains an area of West Hayward comprising approximately 9,700 acres. The watershed of potential impact lies in the Arroyo de Alameda, between Sulphur Creek and Mt. Eden Creek, located 2.5 miles to the northwest and 1.25 miles to the south, respectively. The creeks are ephemeral and flow into the Bay; they are the only surface water bodies in the vicinity of the Eastshore site (EEC 2006a, Section 8.14.3.1).

PROJECT WATER SUPPLY

Staff has received a copy of a “will-serve” letter from the city, dated January 11, 2007, which obligates the city to provide the Eastshore project with between 1,400 and 1,500 gallons per day (gpd) of potable water in accordance with applicable provisions of the city of Hayward Municipal Code. The city provides potable water for residential, commercial, industrial, governmental, and fire suppression uses. The city purchases all its potable water from San Francisco’s Hetch Hetchy system, which is owned and operated by the city and county of San Francisco (COH 2007b).

The “will serve” letter further states: The Hayward Water System is operated under permit of the California Department of Health Services, and water is required to be potable at all times. There are no connections between potable and non-potable water systems. The Water System operates under continuous pressure in order to insure adequate fire protection.

Eastshore Potable Water Demand

For plant operation, Eastshore proposes to use approximately 1.6 acre-feet (AF) of potable water per year. Potable water would be used for all plant needs including domestic water uses, maintenance, irrigation, and fire protection. Potable water would be provided through an existing connection to the city’s municipal water main on Clawiter Road adjacent to the project site (EEC 2006a, Section 2.2.7.2).

Operation of the Eastshore project would require approximately 480 gpd for normal operation and approximately 581 gpd for peaking operation. The proposed average and peak daily water demand are summarized below in **Soil and Water Table 2**.

SOIL AND WATER Table 2
Average and Maximum Potable Water Demand

Water Use	Average Annual Use	Peak Daily Requirement
Engine Closed Loop Cooling	82 gpd	101 gpd
Service Use	331 gpd	413 gpd
Miscellaneous Plant Wash & Landscaping	67 gpd	67gpd
Total Plant Potable Water Demand	**480 gpd**	**581 gpd**

(EEC 2006a, Figure 2.2-6A & 2.2-6B)

Process and Sanitary Wastewater

Wastewater would be generated primarily from domestic sources with a small amount from plant processes. The applicant contends that, because water would not be used for industrial processes, wastewater quality would likely be similar to sanitary wastewater. The primary plant wastewater collection system would collect wastewater from all plant equipment maintenance and service areas. The second wastewater collection system would collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities. The applicant proposes to discharge all wastewater to the city's sanitary sewer system via an existing sewer main located in Clawiter Road (EEC 2005a, Section 2.2.7.2). The city has not yet agreed to accept Eastshore's process and sanitary wastewater stating only that: *Sewer capacity must be purchased at the rate in effect at the time of purchase* (COH 2007b).

Stormwater

The topography of the Eastshore site is relatively flat. The existing grade gradually slopes downward from east to west from an elevation of 26 to 20 feet above mean sea level (MSL). The proposed Eastshore project would have a finished grade of approximately 22 feet above MSL. An existing stormwater collection system drains the majority of the existing site to the city's stormwater system and would be retained. A new stormwater collection system would be added and would discharge first to a detention basin and then to the city's stormwater system (CH2MHill 2007a, data responses 1 & 41).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The Eastshore project was evaluated to determine whether its construction or operation would contribute to erosion, sedimentation, flooding, and degradation of water quality and water supply. Compliance with the comprehensive regulatory procedures that have been adopted, absent unusual circumstances, will ensure that the impacts will not occur. The regulatory procedures typically offer a suite of options for addressing the potential impacts and include performance standards so that impact avoidance or minimization is ensured.

Thus the federal and state LORS and state and local policies presented in **Soil and Water Table 1** were used to determine the significance of any impacts for this

assessment. The following LORS and state and local policies are of particular relevance when determining the significance of potential impacts associated with the project.

- The Clean Water Act requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water.
- The Resource Conservation Recovery Act of 1976 seeks to prevent surface and groundwater contamination.
- City of Hayward Municipal Code Section 11, Article 2, requires the applicant to obtain a permit for water service connection.
- City of Hayward Municipal Code Section 11, Article 3, regulates the quantity and quality of wastewater discharged to the sanitary sewer system.
- City of Hayward Municipal Code Section 11, Article 5, authorizes the city to implement its municipal stormwater program for urban run-off.

For impacts that either exceed published standards or do not conform to established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts and mitigation, presented below, is divided into separate sections relating to construction and operation. For each potential impact discussed, both the applicant's proposed mitigation and staff's determination of the adequacy of that proposed mitigation are discussed. If necessary, staff will propose additional mitigation measures and refer to specific conditions of certification relating to a potential impact and its required mitigation measures.

Construction Impacts and Mitigation

Construction of the Eastshore project would include soil excavation, grading, building construction, and installation of utility connections. Potential impacts to soils can be caused by either increased erosion or release of hazardous materials during construction.

Potential stormwater impacts could result if increased run-off flow rates and volume discharge from the site increase flooding down slope from the Eastshore site. Water quality could be impacted by the discharge of eroded sediments from the site, the released of hazardous materials during construction, or the migration of existing hazardous materials present in the subsurface soil and groundwater. Potential construction-related impacts to soil, stormwater, and water quality, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil Erosion Potential

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and the disturbance of saturated soils. Activities which expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion can result in the loss of topsoil and

increased sedimentation of surface waters down slope of the Eastshore site, or in increased sediment load to the stormwater system.

The magnitude, extent, and duration of those impacts would depend on several factors, including the proximity of the Eastshore site to surface water, the soils affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation or high intensity and short duration run-off events, coupled with soil-disturbing activities, can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind-borne erosion, which can lead to increased particulate emissions, which in turn can adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Water and Wind Erosion

The topography of the Eastshore site, the laydown area, and linear features is nearly level. The primary soil types for the Eastshore project (Clear Lake clay and Danville silty clay loam) are very fine-grained soils consisting of silty clay loam, clay loam, or clay. The risk of erosion for those soils is negligible to slight. The Eastshore site does not have vegetative cover and is currently paved or otherwise covered by buildings and other impervious surfaces. The potential for erosion is further reduced by the fact the proposed area where construction activities would occur is surrounded by other developed properties and buildings, which would limit local ground-level winds which could lead to excessive wind erosion (EEC 2006a, Section 8.9.3, and 8.9.3.2).

The project site is approximately 6.2 acres and is currently occupied by a vacant warehouse and parking lot. The warehouse, foundations, and paved surfaces would be removed as part of the Eastshore construction. The construction laydown area is approximately 4.7 acres and is located directly southeast of the Eastshore site on property owned by Berkeley Farms. The majority of the existing asphalt and concrete would be demolished and removed. Active soil grading would occur over a six-month period within the project site. No significant grading would occur in the laydown area, which the applicant proposes to cover with gravel. The gravel layer would protect the exposed soil from wind and water and serve as a mitigation measure to reduce erosion (EEC 2006a, Section 8.9.3.2.1 and CH2MHill 2007a, Data Response 41).

The applicant expects to use all excavated soil for grading and leveling the site. As outlined in the draft drainage erosion and sediment control plan (DESCP), removal of the existing buildings would provide approximately 16,730 cubic yards (CY) of fill, which the applicant proposes to use to raise the power block within the main plant area. In addition to the 16,730 CY of excavated soil, a significant volume of engineered soil would be required for the power block area (CH2M Hill 20067, Data Response 41). As of this FSA, the applicant has not provided the volume of engineered soil required to raise the power block and bring the entire site to its final design elevation. This information is a requirement of the DESCP and will be submitted prior to site mobilization.

The applicant believes that the relatively flat topography, surrounding developed areas, and the use of construction best management practices (BMPs) would reduce the potential for soil loss and erosion to a negligible level. The draft DESCP submitted by

the applicant provides erosion control BMPs for addressing soil erosion and treatment control BMPs for trapping eroded sediments during construction. The proposed BMPs include mulching, physical stabilization, dust suppression, drainage swales, storm drain inlet protection, and sediment basins. With implementation of BMPs to limit erosion and trap eroded sediments on site, the applicant estimates the soil loss due to erosion at the Eastshore site to be 0.23 tons and PM10 emissions from fugitive dust to be approximately 1.5 tons (EEC 2006a, Sections 8.9.3.2 and Data Response 41). However, given the existing on-site soil contamination from petroleum hydrocarbons, VOCs, and insecticides, the potential impacts relating to soil loss could be exacerbated and the off-site transport of eroded sediments could lead to significant water quality impacts to the Bay.

To ensure the site is adequately characterized and remediated for known soil contaminants and potential groundwater contamination, Condition of Certification **Waste-6** has been proposed in the **Waste Management** section of this FSA. Condition of Certification **Waste-6** requires the project owner to develop a clean-up or soil management plan, which details the number and location of contaminated soil samples, soil gas, and groundwater for further analysis and proper disposal. Through the development of a clean-up or soil management plan, the project owner would be responsible for sampling soil and groundwater for contamination and remediating for hazardous waste. Through implementation of an appropriate site clean-up plan, combined with erosion control measures, the possibility that contaminates could leave the site would be minimized. The project owner would not be allowed to start construction before verifying that the site has been adequately remediated.

The applicant proposes to meet the requirements of the Alameda Countywide NPDES Municipal Stormwater Permit CA0029831 for municipal stormwater and urban run-off discharges within Alameda County. The requirements of the municipal stormwater permit cover 15 Bay Area cities, including Hayward, and other special districts that discharge stormwater to the Bay. With the implementation of appropriate BMPs, which is required by the construction stormwater pollution prevention plan, Municipal Stormwater Permit CA0029831, and the DESCP, the applicant expects to keep soil loss due to water and wind erosion to a negligible amount that would not be considered a significant impact (CH2M Hill 2006d, Data Response 41).

Staff agrees that the proper selection and implementation of BMPs can reduce the impact of water and wind erosion to soil resources to a level that is less than significant. Adherence to the procedures in an approved DESCP would limit both erosion and the migration of remaining contaminants (that may be disturbed by construction) from entering the city's stormwater system. Staff has reviewed both the draft DESCP and the requirements of the Alameda Countywide NPDES Municipal Stormwater Permit. Those documents require the applicant to test and monitor soil and run-off from the Eastshore site. Because adequate steps would be taken as part of the design and implementation of the construction SWPPP and DESCP as required in Conditions of Certification **SOIL & WATER-1 & 2**, staff believes that soil loss and erosion from construction of the Eastshore project would not create a significant impact.

Groundwater

The proposed Eastshore project would not use groundwater during construction and, based on the estimated depth to groundwater of around 12-feet below ground surface, the applicant does not expect to encounter groundwater during plant excavation activities. If groundwater is encountered during construction, the applicant proposes to implement dewatering BMPs that require storage in portable tanks. Any groundwater encountered would be sampled prior to off-site disposal (CH2Mhill 2007a, Data Response 41). Staff agrees that the likelihood of encountering groundwater during construction is remote, and based on the applicant's proposed dewatering BMPs in both the proposed construction SWPPP and DESCP, no impact to groundwater resources would occur during construction of the Eastshore project.

Soil and Groundwater Contamination

Both the Eastshore site and linears are mapped as poorly drained soils consisting of silty clay loam, clay loam, or clay. There is the strong potential for the site to have an undetermined amount of fill over the poorly-drained native soils. A Phase I ESA was prepared for the Eastshore site in October 2005 by TRC (EEC 2006a, Appendix 8.13A).

As follow up to the Phase I ESA, a limited subsurface investigation was conducted in April 2006 by TRC to address outstanding issues identified in the Phase I ESA. Soil contamination was found on site during the 2006 subsurface investigation. TRC found organic constituents in the soil samples consisting of petroleum hydrocarbons, VOCs, and pesticides containing DDT compounds (EEC 2006a, Appendix 8.13A).

The TRC subsurface investigation recommends that, at the time the building is demolished and the concrete removed, additional evaluation be conducted to determine the nature and extent of pollution impacts and appropriate remedial alternatives. Additional evaluation would focus on the nature and lateral extent of impacts and appropriate remedial alternatives for the VOCs. The low levels of DDT reported in each of the three samples collected showed that concentrations diminished with depth, suggesting that these impacts are limited to the surface soil. Reported levels of metals in soil samples collected during this investigation were consistent with typical background levels in regional soils (EEC 2006a, Appendix 8.13A).

The TRC report recommends that the impacted soil beneath the existing concrete be further evaluated when the building is demolished and the concrete removed. TRC concluded that the observed impacts appear to be limited to the surface veneer, thereby indicating that the potential impact to underlying groundwater is minimal.

It is possible that the clean up of impacted surface soils can be completed separately from removal of the concrete. TRC recommended that the reported presence of petroleum hydrocarbons should be further evaluated to confirm that impacts are localized and the magnitude of the impacts is below applicable regulatory thresholds. The TRC report also recommends a follow-up inspection that would focus on confirming that the observed impacts are limited to surface soils (EEC 2006a, Section 8.13.3.1.2 and Appendix 8.13A).

As previously mentioned, Condition of Certification **WASTE-6** requires the project owner to develop a clean-up or soil management plan to identify and remediate areas of the Eastshore construction site that either contain contaminated soil or are underlain by contaminated groundwater that may be encountered during site excavation. Implementation of the SWPPP, DESCP, and site clean-up plan, per Conditions of Certification **SOIL & WATER-1 & 2** and **WASTE-6,** would prevent dispersion of any pollutants by either wind or water erosion. Any remediation that is required will meet established professional standards, which on similar sites have been successful. Therefore, with the implementation of **SOIL & WATER-1 & 2** and **WASTE-6**, the project owner would ensure that potential impacts to soil and groundwater resources would be less than significant.

Stormwater Run-off and Surface Water Quality

Potentially significant water quality impacts could occur during construction, excavation, and grading activities if contaminated soil or groundwater, or other hazardous materials used during construction, were to contact stormwater run-off and drain off site into the city's stormwater system. Water quality could also be diminished if the stormwater drainage pattern concentrates run-off in areas which are not properly protected with BMPs, ultimately causing eroded soil to enter the city's stormwater system.

Prior to construction, the applicant would be required to develop and submit to the city a construction SWPPP and DESCP outlining a strategy to prevent the off-site migration of sediment and other pollutants and to manage run-off from the construction site to the stormwater system. During construction, the city would conduct periodic inspections to ensure compliance with both the SWPPP and DESCP. The city's municipal permit (No. CA0029831) requires BMPs to minimize the amount of pollutants carried by stormwater to the stormwater system.

Staff believes that the volume of stormwater run-off would not measurably increase as a result of construction activities. The 6.2-acre Eastshore site is mostly covered by impervious surfaces. No significant change would occur to the 4.7-acre laydown area since it would be covered with gravel to reduce erosion. The applicant indicates that the details of the specific drainage and treatment control BMPs would be addressed in a more site-specific SWPPP and DESCP. Because of existing soil contamination on the Eastshore site, additional treatment of run-off may be required to limit the discharge of contaminants.

Staff believes that the implementation of treatment control BMPs, possibly including multiple tank media filtration, may be required to limit potential erosion-related water quality impacts prior to discharge. The final treatment control BMP should also allow for the collection of stormwater run-off and testing prior to discharge. In the construction SWPPP, the applicant shall identify which additional treatment measures would be used if the primary treatment control BMP does not provide adequate water quality protection. Through the preparation and implementation of the site-specific construction SWPPP and DESCP, for all project elements as required by the Conditions of Certification **SOIL & WATER-1 & 2**, stormwater discharge to the city's stormwater system would not affect surface water quality.

Construction Water Supply and Wastewater

The applicant divides construction water needs into three primary categories: personal consumption and hygiene, site dust control, and equipment first fill and flushes. Personal hygiene and consumptive uses would be met through the use of portable facilities and bottled water. The total amount of water used during construction is estimated to be less than 1.5-AF over the anticipated 12-month construction period. The applicant proposes to use potable water provided by the city for all construction purposes except personal consumption and hygiene. Based on the small amount of water required during construction and the high possibility for direct contact, the city's secondary treated recycled water cannot be used for construction purposes. The water demand for construction of the Eastshore project would not impact the city's ability to supply potable water to other municipal and industrial customers (CH2MHill 2007, Data Responses 37 & 38).

Construction wastewater generated on site may include stormwater run-off, groundwater from dewatering, equipment wash-down water, and water from pressure testing the service utilities. The improper handling or contamination of construction wastewater could cause a broader dispersion of contaminants to soil, groundwater, or surface water. A potentially significant impact to water quality during construction could result if stormwater run-off encounters contaminated soil or groundwater during excavation and grading activities. Stormwater run-off from contaminated areas may diminish the quality of stormwater entering the city's stormwater system. This discharge could contain increased pollutant levels over the existing conditions and include constituents that could be hazardous.

During construction, wastewater and stormwater run-off would be managed to maintain compliance with the required construction SWPPP and DESCP. Construction dewatering and other construction wastewaters from equipment washing are required to be contained for subsequent off-site disposal if contaminated (CH2MHill 2007, Data Response 41). The discharge of any non-hazardous or hazardous wastewater during construction, other than stormwater, must be in compliance with the city's municipal stormwater permit for discharge to the stormwater system.

Conditions of Certification **SOIL & WATER-1 & 2** require the project owner to prepare a construction SWPPP and DESCP for all Eastshore project features including the laydown area and linear features. Approval and implementation of those plans, consistent with the requirements of Conditions of Certification **SOIL & WATER-1 & 2,** would mitigate potential erosion, sedimentation, or contamination impacts to water quality to less than significant levels and would also be consistent with provisions of both the Clean Water Act and the city's municipal codes.

Operation Impacts and Mitigation

Operation of the Eastshore project could lead to potential impacts to soil, stormwater run-off, water supply, and wastewater treatment. Soils may be impacted through erosion or the release of hazardous materials used during operation of the project. Stormwater run-off from the site could result in potential impacts if increased run-off flow rates and volumes increase down-slope flooding. Water quality could be impacted by the discharge of eroded sediments from the site, the discharge of hazardous materials

released during operation, or the migration of existing hazardous materials present in the subsurface soils and groundwater. The water supply for plant operation and landscaping could lead to potential impacts to the existing potable water supply.

Wastewater discharge to the city's stormwater system could lead to potential impacts if the Eastshore project discharges wastewater with constituent concentrations beyond the city's permitted discharge limits. Potential impacts to soil, stormwater, water quality, water supply, and wastewater related to the operation of the project, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil

During operation of the Eastshore project, the entire site would be covered with impervious material, gravel, or landscaping so that no soil is exposed. The construction laydown area would also be covered with gravel to prevent erosion, and the property would be returned to Berkeley Farms after its use as the laydown area is completed.

The applicant proposes to implement a site-specific Industrial SWPPP and to comply with the city's municipal stormwater permit. The SWPPP would contain appropriate details for structural stormwater treatment and detention. Final design for the structural BMPs would be incorporated into the final construction plans and the Industrial SWPPP would contain operation and maintenance instructions for the structural BMPs. The applicant proposes both structural and treatment BMPs for its Industrial SWPPP, which includes an on-site detention basin and permanent erosion and sediment control through site landscaping or other vegetative cover (EEC 2006a, Appendix 8.14B).

Soil impacts and the potential for soil erosion would not be significant. An industrial SWPPP for plant operations would be developed to set performance and monitoring standards that are required for effective stormwater pollution identification and mitigation. The industrial SWPPP would address timing and methods for monitoring landscape development, as well as reporting and response requirements (EEC 2006a, Section 8.9.5.2). Condition of Certification **SOIL & WATER-3** would require submittal and implementation of the industrial SWPPP, to include the provisions of the city's Municipal Code, Chapter 11, Article 5 and NPDES Permit No. CA0029831. With implementation of the site-specific industrial SWPPP, no significant impacts to soil resources from plant operation are expected.

Surface and Groundwater

The development of roads, buildings, and other impermeable surfaces as part of the Eastshore project would not substantially increase either the run-off rate or volume from the Eastshore site. It is not anticipated that there would be increased stormwater run-off from the site, or from the potential for increased sediment and contaminants conveyed off site. The proposed project would prevent increased stormwater run-off through development of structural BMPs that comply with Condition of Certification **SOIL & WATER-3**.

Stormwater

During its operation, the Eastshore project would be essentially flat with paved, graveled, or landscaped surfaces. The amount of post-construction run-off from the site is not expected to exceed pre-construction run-off. The applicant has designed the stormwater collection system and a detention basin based on a 24-hour, 100-year rainfall event (EEC 2006a, Appendix 8.14B). The applicant proposes to submit and implement an industrial SWPPP for the protection of surface and groundwater and to meet the requirements of the city's Municipal NPDES Permit.

Stormwater from the site would be discharged to the city's stormwater system. Compliance with the industrial SWPPP for plant operations would require site-specific BMPs to identify and mitigate pollutants of concern. During plant operation, the applicant proposes to implement BMPs to address potential pollutants generated on site; industrial areas exposed to the elements; material loading and storage areas; dust-generating activities; spill and leak prevention; potential non-stormwater flows; and prohibitions for polluted discharge and waste handling. Inspections and monitoring (including sampling) would also be conducted in accordance with industrial SWPPP requirements (EEC 2006a, Section 8.14.6.3).

With the submittal and implementation of the site-specific Industrial SWPPP, including the provisions of the city of Hayward's Municipal Code, Chapter 11, Article 5, NPDES Permit No. CA0029831, and the Condition of Certification **SOIL & WATER-3**, the impacts to surface water from stormwater run-off during the Eastshore project's operation would be less than significant (EEC 2006a, Section 8.14.6.3).

Plant Drainage

The applicant proposes to discharge wastewater from miscellaneous plant uses to the city's sanitary sewer facilities. The proposed Eastshore project would not have a cooling tower, so no evaporative cooling water would be required for the facility. Quality and quantity of industrial wastewater discharges to the city's sanitary sewer system must be in compliance with the municipal discharge permit issued by the city as required under city of Hayward Municipal Code Chapter 11, Article 3. The applicant expects discharge from the Eastshore project to be within the city's discharge limits because of the relatively small volume of anticipated plant discharge. Because the applicant expects to meet all water quality standards for treated wastewater, it contends that there would be no impact to the city's sanitary sewer and wastewater treatment system (EEC 2006a, Section 8.14.6.4).

Staff agrees that no significant water- or soil-related impacts are expected due to operational wastewater discharge to the sanitary sewer system if the project owner complies with Condition of Certification **SOIL & WATER-5**, which requires the project owner to comply with city of Hayward Municipal Code Chapter 11, Article 3.

Spill Prevention

Hazardous materials would be stored within secondary containment to prevent the potential dispersion of chemical spills by stormwater. Secondary containment areas including curbs, berms, non-porous pavement, sumps, and outlet valves, would be employed as necessary in the design of loading and unloading areas for chemicals,

above-ground chemical storage tanks, container storage facilities, outside storage, and maintenance areas. Oil or hazardous substances collected within these containment areas would be isolated for proper clean-up and disposal according to local, state, and federal regulations (EEC 2006a, Appendix 8.14.B).

Operational BMPs would be adopted as part of the Industrial SWPPP to implement good housekeeping, preventive and corrective maintenance procedures, and steps for spill prevention and emergency clean up in order to prevent stormwater pollution (EEC 2006a, Appendix 8.14.B). Condition of Certification **SOIL & WATER-3** requires that the project owner prepare an Industrial SWPPP for operational activities that include both monitoring and testing requirements. Compliance with **SOIL & WATER-3** would ensure that there are no significant impacts or conveyance of pollutants to the city's sanitary sewer or stormwater system. No significant impacts to surface or groundwater resources are expected from the operation of the Eastshore project.

Tsunami and Seiche

Tsunamis are waves typically generated offshore or within large bodies of water during a subaqueous fault rupture or subaqueous landslide event. Seiches are waves generated within a large body of water caused by the horizontal movement of an earthquake. Due to the proximity of the project site to the Bay, there is a potential for the project site to be impacted by a tsunami or seiche from the occurrence of a major earthquake along the San Andreas and/or Hayward faults.

According to the city's 2002 General Plan, a tsunami with a wave height of 20 feet at the Golden Gate bridge, which is likely to occur approximately once every 200 years, would result in a run-up of fewer than 10 feet above sea level if it reached the city. Since the project site lies at an elevation of approximately 22 feet above sea level, and is located approximately 1.5-miles from the shore of the Bay, the likelihood is low that the site would be impacted by a tsunami or seiche (EEC 2006a, Section 8.14.6.6).

The general topography of the region is flat and there are no significant dams or levees in the project vicinity. Additionally, the project site would be level with a slight slope to the west after development. The site grading and drainage would be designed to comply with all applicable federal, state, and local regulations. The general site grading would establish a working surface for plant operation and would provide positive drainage from buildings and structures to reduce the potential of on-site flooding hazards. The project is not located in a flood hazard zone, as defined by the Federal Emergency Management Agency (FEMA) (EEC 2006a, Section 8.14.6.6).

Groundwater

Activities at Eastshore would have minimal potential to adversely impact groundwater resources in the project area. Depth to groundwater was detected at approximately 12 feet bgs. Eastshore operation would neither use nor impact groundwater resources below the project site (EEC 2006a, Section 8.14.6.5).

Plant operation and the effects of plant emissions on groundwater by leaching through the soil are expected to be less than significant. The Niles Cone Groundwater Basin is divided by the Hayward Fault, which extends north to south along the base of the Diablo

Range (approximately 3-miles east of the proposed Eastshore project). The Hayward Fault has a low permeability that impedes the lateral flow of groundwater. Along with this low permeability and the presence of numerous housing developments along the Diablo Range, the addition of small amounts of nitrogen (principally as oxide of nitrogen) would be insignificant within the context of fertilizer, herbicides, and pesticides typically used by homeowners.

The small amount of nitrogen from the Eastshore plant would be absorbed by the soil and vegetation in the undeveloped sections of the Diablo Range and within the East Bay communities. In the developed areas where there are roads, houses, and businesses, runoff from rain events will be heavily contaminated with petroleum hydrocarbons and other pollutants. The trace amounts of nitrogen in this runoff would not be cumulatively considerable. A detailed discussion of nitrogen deposition is found in the Biological Resources and Air Quality sections of the FSA. Additionally, surface runoff is collected by storm drains and does not come in contact with groundwater. Therefore, the Eastshore project's emissions would cause less than significant impacts to the groundwater in the vicinity and downwind from the plant(DWR 2004, EEC 2006a, Section 8.9.4.4).

Stormwater run-off from the hazardous materials containers at the plant site would be collected in plant drains, tested, and either trucked off site or discharged to the city's stormwater system. No underground chemical storage tanks are proposed at the project site and no releases of contaminated stormwater from the plant site are expected. Therefore, no contact with groundwater would occur. No significant impacts to groundwater resources would result from plant operation if a site-specific Industrial SWPPP is implemented as required by Condition of Certification **SOIL & WATER-3**.

Water Supply

The Eastshore project would use very little make-up water because of its closed-loop cooling system. Since there would be neither evaporative cooling nor steam generation, no water demineralizing system is required. Site water usage would be primarily for personal consumption, sanitary purposes, landscape irrigation, and equipment washdown. Those water requirements would be met through an existing connection to the city's municipal water main on Clawiter Road adjacent to the project site. The city receives its potable water from the city and county of San Francisco's regional water system, which is operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Hetch-Hetchy Reservoir located in Tuolumne County in the Sierra Nevada.

Potable water would be used for all plant needs, and total potable water consumption would average approximately 1.0 gallon per minute (gpm) during periods of plant operation. Potable water consumption is divided into the following uses:

- cooling system make up and maintenance;
- turbo-compressor cleaning;
- general powerhouse and exterior service water;
- personal consumptive/sanitary uses;

- landscape irrigation; and
- fire protection.

California Water Code Section 13551 considers the use of potable water for industrial and irrigation uses a waste and unreasonable use of potable water within the meaning of Article X of the State Constitution if recycled water is available. Staff has evaluated the use of secondary treated recycled water form the city's water Pollution Control Facility (WPCF) for plant operation and landscape irrigation purposes, and concurs with the applicant that the infrastructure required to bring recycled water to the Eastshore plant, along with added treatment costs, would be economically prohibitive.

In Data Response 40, the applicant evaluated the feasibility of using recycled water from the WPCF and determined that a pipeline from the WPCF would cost approximately $320,000. Additional costs to procure easements and provide additional treatment of the secondary effluent for unrestricted use would increase the installation costs to over $500,000 (CH2Mhill 2007a, Data Response 40). Because of the increased costs of the pipeline, on-site treatment, and future operation and maintenance of the treatment system, staff has determined that recycled water of adequate quality at a reasonable cost is not available as defined in the provisions of California Water Code Section 13550.

The annual consumption of potable water for plant operation is approximately 1.6-acre feet. This volume is roughly equivalent to the amount of water consumed by three single-family households. The city's water supply agreement with the SFPUC does not place a numerical limit on the amount of water provided by the SFPUC. The only limit on the amount of water the city can receive from the SFPUC is based on the city's storage and distribution system. On April 6, 2005, Hayward provided the SFPUC with a written demand projection. The SFPUC responded in writing on June 1, 2005, confirming that it can meet the city's water demand in years of average and above-average precipitation. The city's projected supply and demand, through 2030, increases from approximately 21,300 AFY in 2005 to approximately 31,300 acre feet in 2030 (COH 2005).

Because the proposed potable water consumption for the Eastshore project is small and largely for personal consumptive and hygiene use, staff agrees with the applicant that the use of potable water for all plant operation needs would cause no adverse impacts to the city's current and future potable water supply.

Sanitary Wastewater

Sanitary wastewater generated from sinks, toilets, and other sanitary facilities at the Eastshore site would be discharged to the city's sanitary sewer system. The discharge of any wastewater to the city's sewer system would be subject to the requirements of the Hayward Municipal Code Section 11, Article 3, which regulates both the quantity and quality of discharge to the city's sewer system. The city is under the authority of the East Bay Dischargers Authority. Eastshore wastewater would be discharged into the city‘s wastewater collection system in accordance with the wastewater municipal code.

Condition of Certification **SOIL & WATER-5** requires that the project owner provide the compliance project manager (CPM) with a copy of the discharge permit showing compliance with the city's Municipal Code Section 11, Article 3. Compliance with **SOIL & WATER-5** ensures that there would be no significant impacts or conveyance of pollutants to either groundwater or soils from Eastshore's wastewater discharges to the city's sanitary sewer system.

CUMULATIVE IMPACTS AND MITIGATION

The Eastshore project would neither cause nor contribute to cumulative impacts on soil and water resources. Sound engineering practices and BMPs would be used in both the project's design and operation. Stormwater discharge practices would strictly adhere to state and local agency water quality standards. The Eastshore project would comply with the city's municipal discharge permit and the state NPDES permit for water quality standard, further ensuring that cumulative impacts on local waterways would be avoided. Drainage volumes and peak-flow rates from the site would be mitigated and structural BMPs designed in compliance with the requirements of the city's stormwater management and urban run-off control ordinance. No significant impacts to either surface water or groundwater quality are expected during construction or operation of the Eastshore project (EEC 2006a, Section 8.14.9).

Soils

Construction activities relating to the Eastshore project may cause a temporary increase in cumulative wind and water erosion due to soil-disturbing activities until either stabilized or covered with pavement. The Eastshore project's linear facilities would be installed in existing roadways and utility rights-of-way to the greatest extent possible, and could therefore contribute to a significant cumulative impact if existing utilities are impacted and service disrupted. The applicant has provided a draft DESCP for construction activities. The draft DESCP includes linear facility construction. Implementation of both the DESCP and SWPPP for all construction and industrial activities would mitigate significant adverse impacts from soil erosion.

Mitigated soil loss would reduce adverse soil impacts to less than significant levels. However, given the proximity of the Eastshore site to surrounding industrial and commercial properties that currently experience impaired air quality, the increase in PM10 emissions from wind erosion could lead to adverse cumulative air quality impacts. These air quality impacts could be further exacerbated by hazardous soil contaminants known to exist on the Eastshore site. To limit the potential for impacts relating to wind erosion, the applicant would need to adhere to the requirements of Conditions of Certification **AQ-SC 2, 3, & 4**. If the requirements of Condition of Certification **AQ-SC 2, 3, & 4** are met, staff believes that the project's contribution to soil resources and air quality impacts from wind erosion would not be cumulatively considerable.

Surface Hydrology

Disturbed soil could increase the sediment and pollution loading down slope from the project site. However, no significant impacts are expected if BMPs are employed in accordance with the DESCP to minimize erosion during and after construction. Both stormwater and non-stormwater discharge from dewatering activities would be monitored and properly disposed of.

Development of the Eastshore site would redirect surface drainage to both a detention basin and to the city's stormwater drains. Implementation of the DESCP and the construction and industrial SWPPPs, along with full compliance with state and local LORS, would mitigate the project's contribution to potential cumulative surface hydrology impacts to a level that is not cumulatively considerable.

Water Supply

Staff has not identified any cumulative development activities which would diminish the supply of potable water from the city's municipal water system.

Groundwater

The Eastshore project would not use groundwater. Groundwater could, however, be encountered during construction and require dewatering. The water encountered would be shallow groundwater and could be contaminated. Groundwater requiring dewatering during construction would be managed in accordance with the DESCP and SWPPPs for construction and industrial activities. The entire Eastshore site would be covered with impervious materials, gravel, or landscaping following construction. Chemical storage areas would have secondary containment. All surface flow from the project area would be discharged to the city's sanitary sewer system. The Eastshore project has the potential to improve groundwater quality through testing and proper disposal in the unlikely event that contaminated groundwater is encountered.

Wastewater

The wastewater streams from the Eastshore project include plant drainage and process and sanitary wastewater. The combined wastewater would be monitored to ensure that it complies with the city's municipal codes and discharge limits for its sanitary sewer system. These measures would ensure that the project will not contribute to significant adverse cumulative impacts.

COMPLIANCE WITH LORS

The Eastshore project would comply with:

- The Clean Water Act, by gaining coverage under the general and municipal NPDES permits and through the preparation of the DESCP and construction and industrial SWPPPs;
- The Resource Conservation Recovery Act of 1976, through the proper handling and discharge of wastewater;
- The Porter-Cologne Water Quality Control Act, through implementation of the DESCP and SWPPP, as well as adherence to the discharge requirements of Municipal NPDES Permit CA0029831;
- The California Safe Drinking Water and Toxic Enforcement Act, by establishing secondary containment in chemical storage areas and testing all wastewater discharges;
- City of Hayward Municipal Code Chapter 11, Article 2, for the permitted use and hook up to the city's potable water system;

- City of Hayward Municipal Code Chapter 11, Article 3, for the permitted use and hook up to the city's sanitary sewer system; and
- City of Hayward Municipal Code Chapter 11, Article 5, through discharge of construction and operation stormwater to the city's stormwater system.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The County of Alameda (county) and the SFBRWQCB have submitted comments on staff's PSA. Both agencies' comments are in the area of stormwater runoff and pollution control. The following are staff's responses to the agencies' comments.

COUNTY OF ALAMEDA

The County of Alameda Public Works Agency, by letter dated September 11, 2007, (COA 2007a) requests that the project owner submit a completed Drainage Review Checklist and detailed drainage plan to the county's Development Services Department. Staff concurs with the county's request and has included the requirement of a completed Drainage Review Checklist and detailed drainage plan be submitted to the Development Services Department for review in Condition of Certification **SOIL & WATER-2**.

SFBRWQCB

By e-mail dated October 10, 2007, (WB 2007a) the SFBRWQCB has requested that the Construction and Industrial SWPPPs containing Provision C.3 requirements of the Alameda Countywide NPDES Municipal Stormwater Permit (Order R2-2003-0021) be submitted to their office for review and approval. Staff has included SFBRWQCB review and approval of the Construction and Industrial SWPPPs in Conditions of Certification **SOIL & WATER-1 & 3**.

CONCLUSIONS

Staff has not identified any unmitigated significant impacts to soil and water resources provided all proposed conditions of certification are met. The Eastshore project would comply with all applicable soil and water resources LORS. Potentially significant impacts would be mitigated through the preparation and implementation of various construction and operating plans which, if not implemented, could result in soil erosion, contamination to surface and groundwater, or non-compliance with wastewater treatment and discharge requirements.

Existing soil and potential groundwater contamination at the Eastshore site represent the most significant potential threat to soil and water resources from the Eastshore project. Developing and implementing the DESCP and SWPPP for construction and industrial activities would prevent existing site contamination from migrating off site through groundwater transport or the discharge of either eroded sediments or construction wastewater. Conditions of Certification **SOIL & WATER-1, 2, & 3** would serve to mitigate potentially significant impacts to soil and water resources.

During operation of the Eastshore Energy Center, Conditions of Certification **SOIL & WATER-4, 5, & 6** will ensure that potable water use and wastewater discharge are in compliance with state and local LORS.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL & WATER-1 The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activity. The project owner shall develop and implement a Stormwater Pollution Prevention Plan (SWPPP) for the construction of the Eastshore site, laydown area, and all linear facilities. The construction SWPPP shall abide by the city of Hayward's (city) Stormwater Management and Urban Runoff Control Ordinances (Chapter 11, Article 5) set forth in NPDES Permit No. CA0029831 and San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Order R2-2003-0021.

Verification: The project owner shall submit to the CPM a copy of the construction SWPPP that has been reviewed and approved by the SFBRWQCB which includes the requirements of Hayward Municipal Code Chapter 11, Article 5, for Stormwater Management and Urban Runoff Control (Provision C.3 requirements) prior to site mobilization, and retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the SFBRWQCB about the construction SWPPP within 10 days of its receipt or submittal. The project owner shall submit copies to the CPM of all correspondence between the project owner and the city about the city's Stormwater Management and Urban Runoff Control Ordinances within 10 days of its receipt or submittal. This information shall include copies of the Notice of Intent and Notice of Termination for the project.

SOIL & WATER-2 Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan (DESCP), which will ensure the protection of water quality and soil resources at the Eastshore site, laydown area, and all linear facilities for both the mobilization and construction of the project. The DESCP shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in the potential for off-site flooding, meets the County of Alameda (county) Development Services Department grading and drainage requirements, and identifies all monitoring and maintenance activities. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1,** and may incorporate by reference any Stormwater Pollution Prevention Plan (SWPPP) developed in conjunction with any NPDES permit. At a minimum, the DESCP shall contain the following elements.

A. **Vicinity Map** – A map(s) at a minimum scale of 1"=100' shall be provided that shows the location of all project elements, with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. **Site Delineation** – All areas subject to soil disturbance for the Eastshore project (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing the boundary lines of all construction areas and the locations of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches, as well as indicate the proximity of those features to the Eastshore project construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale 1”=100’ showing all existing, interim, and proposed drainage systems and drainage area boundaries. On the map, spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. **Drainage Narrative** – The DESCP shall include a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative shall also state the watershed size(s) in acres used in the calculation of drainage control measures. The hydraulic analysis should be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the Eastshore project construction and laydown areas.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and the extent of all proposed grading as shown by contours, cross sections, or by other means. The locations of any disposal areas, fills, or other special features will also be shown. It shall also illustrate existing and proposed topography, tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements of the Eastshore project (project site, laydown areas, transmission corridors, and pipeline corridors). This shall include those materials removed from the site due to demolition, whether such excavations or fill are temporary or permanent, in addition to the amount of material to be either imported or exported. The table shall distinguish whether such excavations or fill are temporary or permanent, and the amount of material to be either imported or exported.

H. **Best Management Practices** – The DESCP shall identify on the topographic site map(s) the location of the site-specific BMPs to be employed during each phase of construction (initial grading/demolition,

excavation and construction, and final grading/stabilization). Treatment control BMPs used during construction should facilitate the testing of stormwater run-off prior to discharge to the storm-water system. BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination. Treatment control BMPs used during construction should facilitate the testing of both groundwater and stormwater. if run-off shows unacceptable levels of contaminants including petroleum hydrocarbons, VOC, or insecticide constituents, the run-off must be treated to acceptable levels before it is discharged.

I. **Best Management Practices Narrative** – The DESCP shall show the location (as identified in H., above), timing, and maintenance schedules of all erosion and sediment control BMPs to be used prior to initial grading/demolition and during project excavation and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule should include the post-construction maintenance of structural control BMPs, or provide a statement when the information is available.

Verification: No later than 90 days prior to the start of site mobilization, the project owner shall submit a copy of the DESCP to the county's Development and Services Department for review and comment that meets the county's grading and drainage requirements and includes a completed Drainage Review Checklist. No later than 60 days prior to the start of site mobilization, the project owner shall submit the DESCP and the county's comments to the CPM for review and approval. The CPM shall consider comments received from the county on the DESCP before issuing his or her approval. The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1,** and relevant portions of the DESCP shall clearly show approval by the Chief Building Official. The DESCP shall be consistent with the SWPPP developed in conjunction with the city's municipal NPDES Permit No. CA0029831 for Construction Activity. The project owner shall provide a narrative in the monthly compliance report on the effectiveness of the drainage, erosion, and sediment control measures, the results of monitoring and maintenance activities, and the dates of any dewatering activities.

SOIL & WATER- 3 The project owner shall comply with the requirements of the General NPDES Permit for Discharges of Stormwater Associated with Industrial Activity. The project owner shall develop and implement a Stormwater Pollution Prevention Plan (SWPPP) for operation of the Eastshore project. The Industrial SWPPP shall abide by the city of Hayward's Stormwater Management and Urban Runoff Control Ordinances (Chapter 11, Article 5) set forth in NPDES Permit No. CA0029831.

Verification: The project owner shall submit to the CPM a copy of the Industrial SWPPP, including all requirements of Hayward Municipal Code Chapter 11, Article 5 for Stormwater Management and Urban Runoff Control that has been review and approved by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) prior to commercial operation, and retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the SFBRWQCB

about the Industrial SWPPP within 10 days of its receipt or submittal. The project owner shall submit copies to the CPM of all correspondence between the project owner and the city about the city's Stormwater Management and Urban Runoff Control Ordinance within 10 days of its receipt or submittal. The Industrial SWPPP shall include a copy of the Notice of Intent for the project.

SOIL & WATER-4 Prior to site mobilization, the project owner shall provide the CPM with two copies of an executed and final Water Supply Agreement in accordance with the city of Hayward (city) Municipal Code Section 11, Article 2, and any other service agreements with the city for obtaining potable water for the construction and operation of the Eastshore project. The agreement(s) shall detail any requirements, conditions, or restrictions on the project owner for the use of potable water. The project owner shall not connect to the city's potable water system without final approval from the city. The project owner shall provide the CPM copies of the final approval from the city and all monitoring or other reports required by the agreement(s). The project owner shall notify the CPM of any violations of the agreement(s) terms and conditions, the actions taken or planned to bring the project back into compliance with the agreement(s) and the date(s) compliance was reestablished.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the CPM two copies of the executed water supply agreement and any other service agreements between the project owner and the city for obtaining potable water for construction and operation of the Eastshore project, in accordance with the city of Hayward Municipal Code Section 11, Article 2. The project owner shall submit results of any water quality monitoring required by the city to the CPM in the annual compliance report. The project owner shall submit any notice of violation of the agreement's terms and conditions to the CPM within 10 days of receipt and fully explain the corrective actions taken in the next monthly compliance report or annual compliance report, as appropriate.

SOIL & WATER-5 Prior to commercial operation, the project owner shall provide the CPM and the city of Hayward (city) with all information and data necessary to satisfy city of Hayward Municipal Code Section 11, Article 3, for the discharge of sanitary and plant wastewater into the city's municipal sewer system. During operation, any monitoring reports provided to the city shall also be provided to the CPM. The CPM shall be notified of any violations of discharge limits or amounts.

Verification: At least 60 days prior to commercial operation, the project owner shall submit the information and data required to satisfy city of Hayward Municipal Code Section 11, Article 3, to the city for review and comment, and to the CPM for review and approval. During operations, the project owner shall submit any water quality monitoring required by the city to the CPM in the annual compliance report. The project owner shall submit any notice of violations from the city to the CPM within 10 days of receipt and fully explain the corrective actions taken in the annual compliance report.

SOIL & WATER-6 The project owner shall use potable water supplied by the city of Hayward (city) for construction and operation of the Eastshore project. Prior

to the use of potable water from the city, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record (in gallons per day) the total volume of water supplied to the Eastshore project. These metering devices shall be operational for the life of the project.

The project owner shall prepare an annual water use summary, which will include both the monthly range and monthly average of daily potable water consumption (in gallons per day), and total water used by the project on a monthly and annual basis, expressed in acre feet. Potable water use on site shall be recorded monthly. For subsequent years, the annual water use summary shall also include both the yearly range and the yearly average water use by the project. The annual water use summary shall be submitted to the CPM as part of the annual compliance report.

Verification: At least 60 days prior to mobilization for the Eastshore project, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the potable water supply and distribution system. Potable water use may be based upon either metering or billing statements from the city.

The project owner shall submit a water use summary to the CPM in the monthly compliance report during project construction and in the annual compliance report during project operation. The project owner shall also provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

REFERENCES

CH2MHill 2007a – CH2MHill/ D. Stein (tn 38930) Data response Set 1A included attachments: *Drainage, Erosion, & Sediment Control Plan*; and air quality and public health data responses, 01/15/2007 rec'd 01/16/2007.

CH2MHill 2007c – CH2MHill/ D. Stein (tn 39468) Data responses, Set 2 03/05/2007 rec'd 03/05/2007.

CH2MHILL 2007g – CH2MHILL/D. Stein (tn 42357) Comments on the PSA in response to CEC Staff's PSA dated 08/17/07. 09/19/2007 Rec'd 09/19/2007.

COA 2007a – County of Alameda Public Works Agency DSD/R. Leon (tn 42333) Letter from PWA DSD – R. Leon. 09/11/2007 Rec'd 09/18/2007.

COH 2007b – city of Hayward/ A. Ameri (tn 39084) Water and Sanitary Sewer Services for Proposed Project. 01/11/2007 Rec'd 01/25/2007.

COH 2005 – city of Hayward 2005 Urban Water Management Plan. December 2005.

DWR 2004 – Department of Water Resources San Francisco Bay Hydrologic Region, Santa Clara Groundwater Basin, *California's Groundwater Bulletin 118*.

USGS 2002 – United States Geological Survey Hydrogeology and Geochemistry of Aquifers Underlying the San Lorenzo and San Leandro Areas of the East Bay Plain, Alameda County, California.

WB 2007a – Water Board/B. Wines (tn 42742) Request for Regional Board Review and Approval. 10/10/2007 Rec'd 10/11/2007.

TRAFFIC AND TRANSPORTATION

Testimony of Shaelyn Strattan and James Adams

SUMMARY OF CONCLUSIONS

- Staff agrees with the Federal Aviation Administration (FAA) recommendation that aircraft should not fly over the Eastshore Energy Center (Eastshore) site below 1,000 feet above the ground because thermal plumes could present a potential hazard to aircraft (small planes and helicopters). However, it is not feasible for aircraft to fly above 1,000 feet because the pattern altitude for the Hayward Executive Airport (Runway 10R/28L) is limited to 600 feet due to over-flight of aircraft on approach to Oakland International Airport and cannot be raised.
- Staff agrees with the California Department of Transportation, Division of Aeronautics (Caltrans) recommendation. Concurring with FAA regarding the project's thermal plumes, Caltrans recommends the Eastshore facility be located at a site sufficiently distant from the Hayward Executive Airport (Runway 10R/28L) to avoid impairing pilots' ability to control or maneuver their aircraft. The Alameda County Airport Land Use Commission passed a resolution recommending that the Eastshore facility be located outside of the Airport Influence Area for the Hayward airport.
- The project site's proximity to the traffic pattern for the Hayward Executive Airport and the downwind departure route for Runway 28L would unreasonably complicate aircraft maneuverability. It would also limit the airspace available for aircraft transit, maintenance flights, training procedures, and normal departures/arrivals that currently occur relatively unimpeded within this portion of the Hayward airport airspace. This would be a significant adverse impact under CEQA that could not be avoided if the project were developed at the proposed location.
- The cumulative effect of the Eastshore and Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. FAA and Caltrans agree that it is impractical and in some cases unattainable for pilots to see and avoid both power plants while attending to their primary responsibility of safely operating their aircraft. The project's contribution to this significant adverse impact would be cumulatively considerable.
- The project would not conform with the purpose of the City of Hayward Airport Approach Zoning Regulations (Hayward Municipal Code) because project-generated thermal plumes could present a hazard to aircraft flying at pattern altitude. Therefore the project would not conform to all applicable laws, ordinances, regulations and standards pertaining to traffic and transportation.
- During construction, potential impacts created by workforce traffic, truck traffic, and the movement of workers and materials between the temporary parking/laydown area would be reduced to a less than significant level by condition of certification **TRANS-1**. This condition provides for preparation, approval, and implementation of a construction traffic control and implementation plan that would, among other provisions, specifically schedule workers, deliveries, and construction-related traffic outside of normal commute hours.

- During operation, workforce and truck traffic to and from the facility is not expected to result in a substantial increase to congestion, deterioration of the existing level of service (LOS), or creation of a traffic hazard during any time in the daily traffic cycle. It would have a less than significant adverse impact along any of the routes or roadway intersections that would be used to access the project site.
- The Eastshore project, in conjunction with construction and operation of the proposed RCEC project, would not have a cumulatively considerable impact on traffic or the LOS of affected roadways, provided all conditions of certification for both projects are fully implemented.

INTRODUCTION

The Traffic and Transportation section of this Final Staff Assessment (FSA) is an objective analysis of the transportation systems in the vicinity of the proposed Eastshore project. It also identifies and addresses the project's consistency with applicable federal, state, and local transportation-related laws ordinances, regulations, and standards (LORS). In compliance with the California Environmental Quality Act (CEQA) and Energy Commission requirements, this analysis identifies potential impacts relating to the construction and operation of the proposed project on the surrounding transportation systems and roadways and proposes mitigation measures (conditions of certification) that would avoid or lessen these impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation that are applicable to this project.

TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Code of Federal Regulations, Title14 Aeronautics and Space, Part 77 Objects Affecting Navigable Airspace (14 CFR 77)	This regulation establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversees the development of antenna farm areas.
Code of Federal Regulations, Title 49, Subtitle B	49 CFR Subtitle B includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and specifies safety measures for motor carriers and motor vehicles who operate on public highways.
State	
California Vehicle Code (CVC), Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14.1,	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.

Chap. 1 & 2; Div. 14.8; & Div. 15	
California Streets and Highway Code, Divs. 1 & 2, Chaps. 3 & 5.5	Includes regulations for the care and protection of State and county highways, and provisions for the issuance of written permits.
Local	
Alameda County Alameda County Airport Land Use Policy Plan (ALUPP)	(California Public Utilities Code §§21001 et seq, relating to the State Aeronautics Act.) An Airport Land Use Compatibility/Policy Plan (ALUCP/ALUPP) provides for the orderly growth of an airport and the area surrounding it, excluding existing land uses. Its primary function is to protect the public's health, safety, and welfare by promoting orderly expansion of airports and adoption of land use measures by local public agencies that minimize exposure to excessive noise and safety hazards near airports. The Alameda County ALUPP works in concert with the Hayward General Plan and Zoning Codes, and the Hayward Executive Airport 2002 Master Plan.
City of Hayward	
General Plan (revised 2002) – Circulation Element	The Hayward General Plan contains seven elements and is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within City of Hayward jurisdiction. The Circulation Element of the Hayward General Plan discusses and analyzes the movement of people and goods through and around the city. The focus is on the system of freeways, local roads, bus and rail transit, and bicycle and pedestrian routes to determine the most effective design possible while enhancing the community and protecting the environment. Bicycle facilities are addressed in the Bicycle Master Plan (1997) and Hayward Executive Airport Master Plan (2002). Consistent with state law, the Circulation and Land Use Elements complement and support one another to provide a balance between land uses and the transportation facilities that serve them.
Municipal Code	
Chapter 7, Article 1 – Property Developers, Obligations as to Streets	Defines the requirements, policies, and procedures to acquire pubic rights-of-way and construct public improvements in connection with the development of property.
Chapter 7, Article 2 – Disturbance of Streets	Regulates the disturbance of existing streets and utility corridors during construction activities.
Chapter 10, Article 2 – Off-Street Parking Regulations	The section of the zoning code strives to relieve congestion; provide for adequate parking, loading and maneuvering areas; protect the appearance and land uses of the area; provide alternative parking options to encourage the development of business and industry; and encourage alternative forms of transportation.
Chapter 10, Article 1, Section 10-1.1600 – Industrial District (I)	Development Plan Standards includes standards for ingress/egress access, truck loading and parking areas for new development projects. The Zoning Ordinance includes permitted uses and development requirements for the "Industrial Zone" designation on the project site.
Chapter 10, Article 6 - Airport Approach Zoning Regulations	This code section (Hayward City Council Resolution #64-038; 9/15/64) was designed to prevent the creation or establishment of airport hazards, thereby protecting the lives and property of the users of Hayward Executive Airport and the occupants of the land in its vicinity, and preventing destruction or impairment of the utility of the airport and the public investment therein.

SETTING

The proposed project site is situated within the Hayward city limits and jurisdiction, in the East Bay subregion of the San Francisco Bay Area (see the **Project Description** section of this document for additional information). Local Traffic and Transportation-related LORS applicable to the project are contained in the City of Hayward's General Plan (2002) and Municipal Code.

The City of Hayward is surrounded by three interstate highways (I-880, I-580, and I-238), as well as three major state highways [State Routes (SR) 92, 185, and 238]. It is also serviced by two Bay Area Rapid Transit (BART) lines, with connectors to a third line, and Amtrak Capitol Corridor train. AC Transit bus routes also criss-cross the area, providing access to local neighborhoods, shopping, jobs, government offices, and surrounding communities. The project site is also located approximately one mile south of the Hayward Executive Airport, immediately adjacent to the downwind departure route for Runway 28L.

The project's location, in the eastern part of the city of Hayward's Industrial Corridor, is in an area that supports both heavy and mixed industrial/commercial activities (see **Land Use Figure 1**). The project would be bounded on the north by the Union Pacific Rail Corridor, several warehouses, and a card-reader gasoline station with accompanying propane tanks; and by Berkeley Farms to the east; a commercial business park and Herning Investments (industrial trucking and storage) to the south; and Depot Industrial Properties (industrial warehousing) to the west. Primary access to the project site would be from the SR92/ Clawiter Road exit north, along Clawiter Road, a two-lane arterial roadway. Secondary access would be from I-880, west along Winton Road, then south on Clawiter.

CRITICAL ROADS AND FREEWAYS

Traffic and Transportation Figures 1 and **2** illustrate the layout of the major roads, potential access routes, highways, and airport in relation to the proposed project site and surrounding Hayward area. The roadways discussion below is based on information contained in the Traffic and Transportation Section provided by the applicant (EEC 2006, Section 8.10), as well as traffic data from the California Department of Transportation [Caltrans 2007(a)] and City of Hayward Public Works, Engineering-Transportation Division [COH PW(h)]. It addresses roadways providing access to and from the proposed project site.

State Route (SR) 92

SR 92 is an east-west highway connecting Hayward and Half Moon Bay. It passes approximately one mile south of the project site. SR-92 is a six-to-eight-lane road, with a High Occupancy Vehicle (HOV) lane on the westbound approach from Hesperian Boulevard (Blvd.) to the San Mateo Bridge toll plaza. The project site can be reached via exits off SR-92 at Clawiter Road and Industrial Blvd.

Interstate 880 (I-880)

I-880 is an eight-lane, north-south freeway that extends from Oakland to San Jose, connecting with I-80 at both locations. It passes east of the project site. I-880 has one

HOV lane in each direction. The project can be accessed from I-880 via the Winton Road exit or west on SR-92 to Clawiter Road.

Clawiter Road

Clawiter Road is a two-lane, north-south arterial road that intersects SR-92 approximately one mile south of the project site. The project would be located at 25101 Clawiter Road, on the west side of the road. Access to the project would be along Clawiter Road from SR-92 to the south or from Industrial Blvd., Depot Road, or West Winton Road to the north.

Depot Road

Depot Road is a two -lane, east-west connector road that extends from Hesperian Blvd. to approximately one mile west of Clawiter Road, where it terminates adjacent to the City levees, floodplain, and designated open space. It crosses Clawiter Road just north of the project site.

Industrial Boulevard

Industrial Boulevard is a four-lane, southeast-northwest arterial road that terminates at Clawiter Road, just north of Depot Road. Industrial Blvd. forms the nominal northeast boundary for the Industrial Corridor.

Level of Service

Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream. LOS is a term used to describe and quantify the congestion level on a particular roadway or intersection, and generally describes conditions in terms of such factors as speed, travel time, and delay. The Highway Capacity Manual[1] (HCM) defines six levels of service for roadways or intersections ranging from LOS A, representing the best operating conditions, and LOS F, representing the worst. A more detailed description of LOS is found in **Traffic and Transportation Appendix A.**

The Alameda County Congestion Management Agency (ACCMA) administers the Congestion Management Program (CMP) for cities within Alameda County. The ACCMA CMP network is comprised of all state highways, principal arterials within the County, and transit corridors within the Metropolitan Transportation System (MTS). Alameda County's LOS standard for the CMP network is LOS E, except where existing facilities are currently operating at LOS F. Certain segments of the following CMP facilities (i.e., freeways and regional routes within Alameda County) have been identified in the 1999 CMP as operating at LOS F. In the Hayward area, these include:

- Interstate 880 (I-880) through San Leandro, Hayward, and Fremont
- State Route 92 (SR 92) through Hayward
- Hesperian Boulevard through Hayward and San Leandro

[1] The *Highway Capacity Manual* (HCM) is the most widely used resource for traffic analysis. The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. The current edition was published in 2000.

The City of Hayward uses the LOS criteria, as defined by the HCM, to qualitatively measure operational characteristics of local roadways. Intersections are analyzed by peak hour intersection capacity and operations rather than daily roadway capacity. An intersection LOS is identified through a letter designation, varying from LOS A (up to 10 seconds of delay) to LOS F (greater than 80 seconds of delay). The measure of effectiveness for an intersection with traffic controls is control delay[2]. For the City of Hayward, LOS E (delays of 55 to 80 seconds) is considered marginal. LOS F represents the worst condition with gridlock and is unacceptable.

For road segments within the City of Hayward, the LOS must be "D" or better to be considered acceptable. The level of service for each roadway segment is determined from the ratio of link volume to link capacity. Congested roadway sections have an LOS of E or F, and just as with intersections, LOS E is considered "marginal" and LOS F is unacceptable. Caltrans considers LOS D to be the limit of acceptable delay for state routes.

Traffic and Transportation Table 2 summarizes the current volume-to-capacity (V/C) ratios and LOS for roadways in the project vicinity and freeways that may be affected by the project during construction and/or operation. The intersections that are nearest the project, Clawiter Road at Depot Road and Clawiter Road at Industrial Blvd, both currently operate at LOS A during the AM peak hour (7-8 am) and at LOS A and LOS B, respectively, during the PM peak hour (5-6 pm).

RAILWAYS

There are three (3) Union Pacific (UP) Railroad corridors that pass through Alameda County, with one passing immediately to the north of the proposed project site. UP Hayward Line is a single track line that runs generally north-south between Oakland and Niles Junction. Trains using this section of UP track include UP freight and BNSF Railway freight. This stretch of track is also part of the Amtrak Capitol Corridor route, which carries the Capitol Route intercity trains, with 32 trains per day, and the Coast Starlight, with two trains per day. Most of the Capitol Route trains and the Coast Starlight pass through the area outside peak commuter hours (SMCTA, Chapter 2). The Hayward Amtrak station is located approximately 4 miles northeast of the proposed Eastshore project site. A second UP rail corridor runs roughly parallel to the Hayward Line and crosses Clawiter Road between the project's encroachment onto Clawiter Road and the Clawiter Road/Depot Road intersection. This track is used primarily for freight traffic carried by the UP Railroad and BNSF Railway. (See **Traffic and Transportation Figure 3**; EEC 2006, Figure 8.10-5.)

PUBLIC TRANSPORTATION

The Bay Area Rapid Transit (BART) and Alameda County (AC) Transit provide the majority of public transit service in the City of Hayward. BART provides high-speed rapid rail network linking major commercial centers with suburban sub-centers. There are three stations within five miles of the proposed project site: Hayward, South

[2] Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents (TRB 2000).

Hayward, and Castro Valley. Connections from the stations to the project site are provided by AC Transit.

The AC Transit system provides local and express bus service to the greater East Bay. Of the 18 lines serving the City of Hayward, two connect the BART and Amtrak stations to the proposed project site. Line 83 runs every hour throughout the day and every half-hour during morning and evening commute hours, and Line 86 runs every half-hour during peak commute hours only. Line 83 stops on Clawiter Road, across the street from the project location. Line 86 follows Industrial Blvd. and Depot Road, with a stop at Industrial Blvd. and Clawiter Road. Both stops are within easy walking distance to the proposed facility.

TRAFFIC AND TRANSPORTATION Table 2
Existing LOS For Roadways Affected By Project

NAME	CLASSIFICATION	PEAK AM V/C[1]	PEAK LOS AM	PEAK PM V/C	PEAK LOS PM
SR-92 I-880 to Hesperian Blvd.	Highway	N/A[2]	N/A	0.75	C
SR-92 Hesperian Blvd. to Clawiter Rd.	Highway	N/A	N/A	0.69	B
SR-92 Clawiter Rd. to San Mateo Bridge	Highway	N/A	N/A	0.86	D
I-880 Winton Rd. to SR-92	Freeway	N/A	N/A	1.08	F
I-880 SR-92 to Tennyson Road	Freeway	N/A	N/A	0.95	E
Clawiter Rd. Industrial Blvd. to SR-92 Westbound Ramp	Arterial	0.89	D	0.94	E
Clawiter Rd. @ SR-92 Westbound & Eastbound Ramps	Arterial	0.74	C	0.78	B
Depot Rd. Dodge Ave. to Clawiter Rd.	Arterial	0.33	A	0.47	A
Depot Rd. Clawiter Rd. to Viking St.	Arterial	0.58	A	0.47	A
Industrial Blvd. Clawiter Rd. to Depot Rd.	Major Arterial	0.25	A	0.32	A
Industrial Blvd. Depot Rd. to SR-92	Major Arterial	0.38	A	0.48	A

Source: EEC 2006, p.8.10-11; EEC 2007, p.27

[1] V/C = Volume-to-Capacity ratio

[2] N/A = Not Available

BICYCLES AND PEDESTRIANS

The updated City of Hayward Bicycle Master Plan was adopted in 1997 and is intended to support the development of a cohesive network of bikeways designed to encourage the use of this non-polluting form of alternative transportation to access major destinations within the City of Hayward. The only bicycle route currently serving the proposed project site is a Class III Bikeway along Clawiter Road. A Class III Bikeway is

generally referred to as a “bike route,” and provides for shared use of a roadway with motor vehicle traffic. The routes are marked by signs, but generally are not striped. The bike route along Clawiter is part of a network of Class II and II Bikeways that connect the Hayward and South Hayward BART stations and the Hayward Amtrak station.

Although there are ongoing efforts in the downtown/government center areas and residential neighborhoods to develop a pedestrian-friendly environment, there is little infrastructure to support pedestrian traffic in the vicinity of the project site. There are no sidewalks, except immediately adjacent and within the small business parks. The gravel or dirt shoulders along Clawiter Road are overgrown and provide uneven footing. There is no crosswalk from the bus stop on the east side of Clawiter to the business park and project side on the west side.

AIRPORTS

The airspace above the Eastshore site is very complex and congested, with Oakland and San Francisco International Airport airspace overlaying the airspace for the Hayward Executive Airport (see **Traffic and Transportation Figure 4**). There are ten airports within a 30-mile radius of the proposed project site, which is located approximately one mile south of the Hayward Executive Airport, immediately adjacent to the left downwind departure path for Runway 28 Left (L). The site is also within the Hayward Airport Influence Area (AIA) which extends out two-to-three miles from the airport boundaries (ALUPP, p.58) and is just south of the Traffic Pattern Zone for the airport (HWD 2002, Exhibit 5B). The airport has two runways: Runway 10 Right (R)/28 L and Runway 10L/28R. The runways are parallel with one another and have a northwest/southeast orientation.

The Class D airspace that surrounds Hayward Executive Airport is controlled between 7 am and 9 pm daily, when the air traffic control tower is in operation. It reverts to Class E, or uncontrolled, airspace when the tower is closed. Hayward Executive Airport has more than 10,000 monthly operations (City of Hayward 2007c), with almost 500 fixed wing aircraft and 19 helicopters currently based on the field. The number of aircraft based at the Hayward airport and operating regularly within this complex, congested airspace has already exceeded traffic projections for the year 2010, with over 320 additional applications for hanger space on a waiting list (COH 2007l, p.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines and applicable LORS utilized by other governmental agencies. Specifically, staff analyzed whether the proposed project would result in the following:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);

- Exceed, either individually or cumulatively, a level of service standard established by the city, county, or state congestion management agency for designated roads or highways;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access;
- Result in inadequate parking capacity;
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks);
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Endanger the takeoff, landing, or maneuvering of aircraft within an airport approach zone, airport turning zone, or airport transition zone.
- Produce a high-velocity thermal plume within an airport approach zone, airport turning zone, or airport transition zone.
- Produce a thermal plume in an area where flight paths are expected to occur below 1,000 feet from the ground.
- Have individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

In general, a power plant and its related facilities may also result in potentially significant impacts if it is located near schools, results in ground-level fogging of roads and highways, or requires the transportation, storage, and/or use of hazardous materials. Please see other sections of this document, as noted, for a detailed discussion of any additional discussion of project impacts, recommended mitigation, or conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The following section describes potential traffic and transportation impacts associated with the construction and operation of the Eastshore project.

Construction Traffic Impacts and Mitigation

Construction Workforce Traffic

The Eastshore project is expected to take approximately 18 months to complete construction, beginning in the fourth quarter of 2007 and commencing commercial operation by the second quarter of 2009. The project's construction workforce requirements would be relatively small during mobilization and initial site preparation and would be reduced again during the final four months of work (generally less than 100 workers). The workforce would begin to increase in month six and maximum worker involvement of up to 230 workers is projected to occur during months 8-12. An average of 226 workforce vehicle trips would occur Monday through Friday, between the hours

of 6:00 a.m. and 4:00 p.m., with a maximum of 424 trips occurring during Months 10 and 11.

Construction activities would generally occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday. However, earlier or staggered arrivals may occur to allow workers to avoid the peak morning and afternoon commute times. Peak commute hours in the project area are from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m., Monday through Friday. Unavoidable delays, emergency situations, delivery of oversized loads, or initial start-up procedures may require extended work hours or even 24-hour operations (EEC 2007(d), WKS-12, pp.29-30).

The project requires a diversified workforce with expertise in the full spectrum of industrial construction. Workers are expected to come primarily from the East Bay area and would use I-880, SR-92, and a network of local roadways to access the construction site. The primary access route would be along SR-92 to the Clawiter Road exit; then, north on Clawiter to the temporary parking area immediately across from the project location.

Construction Truck Traffic

Truck traffic for the Eastshore facility would be generated primarily by the removal of materials from the demolition of the existing warehouse and delivery of supplies and materials during the construction process. Dump trucks and those delivering heavy graders or other construction equipment would predominate during the first three months of construction. A passenger car equivalent (PCE) factor of three cars per truck was used to determine the traffic impacts of trucks and heavy equipment deliveries (National Research Council 1994). The delivery of construction materials would begin following demolition and continue through the remainder of the construction period, tapering off after month 13. Trucks may deliver materials directly to the site or to the construction laydown area immediately across Clawiter Road. Trucks may also transport materials to and from the laydown area to the project site on a daily basis.

The primary truck route would be along SR-92 to the Clawiter Road exit; then, north along Clawiter Road to the project site or construction laydown area. Secondary routes would be from SR-92 along Industrial Blvd. to Clawiter Road or from I-880 along W. Winton Road; then south on Clawiter Road to the project site. No deliveries would occur during the morning or afternoon peak commute hours.

Total Construction Traffic

The applicant has indicated that a Traffic Management Plan (TMP) would be prepared to address the movement of vehicles and materials, including arrival and departure schedules, designated workforce and delivery routes, hazardous materials delivery schedules and coordination with Caltrans, and other traffic-related activities and resulting impacts during both construction and operation of the proposed facility (EEC 2007(d), pp.21-24). The TMP would incorporate mitigation to address worker safety and increased traffic delays and congestion related to workers crossing Clawiter Road between the temporary parking/laydown area and the construction site (EEC 2006, p.8.10-21). A Heavy Haul Plan (HHP) would also be prepared to address the transport and delivery of heavy and oversized loads requiring permits from Caltrans or other state

and federal agencies (EEC 2007(d), pp.24-26). Energy Commission staff concurs with the applicant's proposed preparation of a TMP and HHP as mitigation for potential impacts (see discussions below). Staff has proposed condition of certification **TRANS-1**, which provides for preparation of a traffic control and implementation plan. The applicant's proposed TMP, HHP, and PTMP would fulfill this condition, provided all requirements of **TRANS-1** are met.

The California Department of Transportation (Caltrans) is about to begin major reconstruction of the existing I-880/SR-92 interchange. The limits of the I-880/Route 92 Interchange Reconstruction Project are the I-880/West Winton Avenue Interchange to the north, I-880/West Tennyson Road interchange to the south, Mt. Eden Overhead (a railroad overpass) west of the Route 92/Industrial Boulevard interchange to the west, and the terminus of Route 92 as a freeway at the intersection of Jackson and Santa Clara Streets to the east (Caltrans 2003, p.1-11). This encompasses several of the intersections that would be used by delivery and workforce traffic for the Eastshore project. Caltrans has prepared a Transportation Management Plan containing a comprehensive method of reducing traffic disruption and relieving congestion during the reconstruction project (Caltrans 2005). Energy Commission staff has been advised that the project would begin in September 2007 and should be completed in mid-2011. Due to the high volumes of traffic along these sections of state highway and interstate, lane and ramp closures would be limited to night and off-peak hours (Caltrans 2003, p.3-135). If this plan is implemented, Energy Commission staff believes that existing traffic patterns along the affected sections of the roadways would not be significantly impacted, including the Clawiter Road and Industrial Blvd. exits that would be used most frequently by the Eastshore project.

Average and peak trip generation projections for commuting construction workers without staggered work hours or other mitigation, based on data provided by the applicant are summarized in **Traffic and Transportation Table 3** below.

TRAFFIC AND TRANSPORTATION Table 3
Estimated Trip Generation During Average and Peak Construction Periods[d]

Vehicle Type	Average Daily Trips	Peak Daily Trips	Morning Peak Hours		Evening Peak Hours	
			In	Out	In	Out
Commuter vehicles	226	424	114/212[b]	0	0	114/212[b]
Delivery Trucks[a]	16	36	0	0	0	0
Heavy Trucks[c]	10	12	2-3	2-3	2-3	2-3
TOTAL	256	472	117/215	2-3	2-3	117/215

Source: EEC 2006, Table 8.10-5 and Table 2.2-4

[a] Delivery truck trips would occur outside peak commute hours.
[b] Average and Peak Daily trips during peak hours would be slightly less during times when shift work or 24/7 operations in progress.
[c] Distribution of truck trips during commute hours are unknown, so trips are noted as occurring in both the AM or PM time frame. Heavy Trucks include loaded dump trucks, equipment movers, and tractor/trailers.
[d] Vehicle trips based on 1.106 occupancy (EEC 2007(d), Table WKS 10-2, p.28)

Based on the estimated increase in local traffic counts with the addition of the workforce commuter traffic during the construction phase of the Eastshore project, changes in

LOS would occur along primary access routes to and from the project site, as summarized in **Traffic and Transportation Table 4** below.

TRAFFIC AND TRANSPORTATION TABLE 4
Construction Impacts on LOS For Intersections Affected By Project

INTERSECTION	EXISTING LOS (AM)	LOS DURING CONSTRUCTION (AM)	EXISTING LOS (PM)	LOS DURING CONSTRUCTION (PM)
No Change to I-880 or SR-92 LOS				
Clawiter Rd. and West St.	B	B	B	B
Clawiter Rd. and Industrial Blvd	A	A	B	B
Clawiter Rd. and Depot Rd.	A	**B**	A	**C**
Industrial Blvd. and Depot Rd.	B	**C**	B	B
Clawiter Rd/Breakwater Ave. at SR-92 Westbound ramps	B	B	B	B
Clawiter Rd/Eden Landing Rd at SR-92 Eastbound ramps	C	C	E	E
Industrial Blvd/Cryer St. at SR-92 Westbound ramps	B	**D**	C	**D**
Clawiter Rd. at the Project Site Entrance	A	**C**	A	**D**
Clawiter Rd. at the Temporary Parking Lot Entrance	A	**C**	A	**C**

Source: EEC 2007(d), p.18-19.
BOLD indicates a change in the LOS from existing conditions.

As shown in **Traffic and Transportation Table 4** above, the project, as proposed, would be expected to measurably increase congestion at five intersections along the primary and secondary access routes to the proposed project site during the morning commute hours and at four intersections during the evening commute. The most substantial degradation in LOS would occur on Clawiter Road at the entrance to the project site during the evening commute hours, with the LOS deteriorating from A to D. The Industrial Blvd./Cryer Street intersection with westbound ramps of SR-92 would also deteriorate from LOS B to LOS D during the morning commute and from LOS C to LOS D in the evening. The Clawiter Road/Depot Road intersection would drop in both the morning and evening from LOS A to LOS B and LOS A to LOS C, respectively. The Industrial Blvd./Depot Road intersection would also deteriorate during the morning commute from LOS B to LOS C. Although all intersections would retain an “acceptable” LOS standard of delay or congestion, based on the City of Hayward’s LOS standards, introduction of an average of 256 vehicle trips daily and up to 472 additional vehicle trips during the peak construction months would result in a substantial increase in traffic at several intersections during already congested commute windows and would constitute a significant adverse impact under CEQA.

The applicant has proposed to limit worker arrival/departure between 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Although these are the peak hours per traffic count in

the project vicinity, commute traffic maintains a relatively consistent level of congestion for approximately one hour either side of those peak hours, requiring restrictions beyond the peak hour time frame to fully mitigate the potential impact. The applicant has proposed that Industrial Blvd. be designated as the primary access route for construction-related traffic (EEC 2007(d), p.22) to reduce the impact of portions of Clawiter Road that are already at a LOS D during evening peak commute hours. The addition of the workforce vehicle trips could degrade the LOS on these sections of Clawiter Road from D to E (marginal). The construction traffic control and implementation plan required in condition of certification **TRANS-1** would include a section requiring that workers arrive and depart during non-commute hours, which would reduce the project-related contribution to traffic to a less than significant level. This section of the plan would ensure the project would not degrade the existing LOS or significantly increase traffic congestion in the project vicinity.

Truck traffic associated with the Eastshore project constitutes only five to ten percent of project-related traffic, but has the potential to significantly impact traffic congestion and safety in the vicinity of the Clawiter Road encroachments. The applicant has already identified the delivery of heavy materials and hazardous materials during the peak commute hours as an incompatible use and proposes to restrict deliveries to off-peak hours and heavy/oversized loads to a 10:00 a.m. to 4:00 p.m. window. Additionally, the applicant proposes to provide a trained flagger to coordinate and control traffic during entry/exit of heavy vehicles or trucks that would be unable to execute a safe turn within the normal traffic lane. (EEC 2007(d), pp.22-23) However, peak heavy truck traffic, related to demolition efforts, would occur during the first two to three months of construction and the addition of slow-moving vehicles (e.g., heavily-loaded dump trucks) into an already congested commute could create a hazardous incompatible use at the Clawiter Road/project site entrance and Clawiter Road/Temporary Parking Lot Entrance. Likewise, the movement of materials to or from the temporary construction laydown area across Clawiter Road to the project site during the commute could also cause a similar impact. Left unmitigated, these activities could constitute a significant temporary impact under CEQA. The construction traffic control and implementation plan required in condition of certification **TRANS-1** would include a section requiring the scheduling of truck traffic and prohibiting the arrival or departure of heavy trucks and construction equipment and the transfer of materials between the construction laydown area and project site during commute hours. This condition of certification, along with other measures proposed and incorporated into the project description by the applicant, would prevent the creation of a potentially hazardous situation and any significant contribution to traffic congestion in the project vicinity.

Construction Workforce Parking and Laydown Area

The proposed Eastshore project would be located in an area with inadequate parking for existing businesses and little on-street parking. Parking on the project site is also limited and would be further restricted by construction activities. The applicant has acknowledged that onsite parking would be inadequate during the construction phase of the project and has identified a location outside of the primary site boundaries to accommodate workforce vehicles, shown in **Traffic and Transportation Figure 5** (EEC 2006, Figure 2.2-7, Site and Laydown Area). The proposed temporary construction parking and laydown area is across Clawiter Road from the project site and would only

be used during the 12-18 month construction process. This parcel is zoned Industrial, but is not currently used for parking. Energy Commission staff agrees with the proponent's traffic consultant that the parking areas would be adequate to accommodate the estimated 238 parking spaces needed during the peak construction months, with room for driving aisles and the laydown area for materials storage (CH2MHill 2007a, p.12). Allowing for 228 standard parking spaces at 9' X 19' (38,988 ft^2) and 10 handicapped parking spaces at 17' X 19' (3,230 ft^2), with space for adequate circulation among the parking aisles, would require less than one acre of the 4.65 acres available.

Access to the temporary parking and laydown area would be at an existing encroachment onto Clawiter Road, approximately 0.25 mile south of the proposed project driveway. According to David Rizk, City of Hayward Planning Manager, an administrative use permit, per Municipal Code §10-2.402, would not required for an off-site parking area, provided the use is temporary, is consistent with similar temporary uses in the general vicinity, and would not be prevent or limit any existing or future permitted use. However, a site review would normally be required, along with conditions to protect the resources and ensure the property is returned to a condition that would not prevent or limit future use. The development plan required in condition of certification **LAND-1** would include a section addressing parking configuration, surfacing, and encroachment requirements, and would exclude project workers from using street parking and local lots (see the **Land Use** section of this document). This would mitigate the potential impact resulting from a large influx of temporary workers into an area with inadequate parking for existing businesses. The project owner is expected to enforce a policy that all project-related parking occurs in designated parking areas. Therefore, construction-related traffic is not expected to impact the availability of parking in the area.

Although convenient to the project site, the location of the temporary construction parking and laydown area would require workers to cross Clawiter Road to reach their worksite. Clawiter Road is a two-lane, arterial road, with heavy congestion during the commute hours and a traffic mix containing at least 12 percent truck traffic (COH 2007h). There are no sidewalks, pedestrian crosswalks, or traffic lights to facilitate the mid-block crossing. The closest controlled intersection (Depot Road) would necessitate walking along an unimproved road shoulder for more than 0.25 mile and crossing the UP railway tracks. Large numbers of workers (up to 235 per day) crossing Clawiter Road at an undefined, unsignalized, mid-block location during the morning and afternoon commute hours would create the potential for increased traffic delay and congestion and a hazardous incompatible use, especially if conducted concurrently with the movement of materials between the laydown area and construction site. Left unmitigated, these activities could constitute a significant temporary impact under CEQA. The construction traffic control and implementation plan required in condition of certification **TRANS-1** would include a section addressing the movement of workers between the parking/laydown area and the construction site, including availability of flaggers to provide traffic control for pedestrian crossing during the commute hours; restrictions on mid-block pedestrian crossing during material movements; and the addition of temporary "yield" signs to heighten pedestrian and driver awareness. This condition of certification, along with other measures proposed and incorporated into the

project description by the applicant, would reduce the potential for increased traffic congestion and a hazardous incompatible use to a less than significant level.

Hazards Due To A Street Design Feature

The primary access apron (driveway) to the Eastshore project is an encroachment onto Clawiter Road from the west side of the road. The driveway is proposed to be 30 feet wide to accommodate right turns for trucks approaching from the north, with a turning radius of 41 feet (EEC 2007(d), p.16). The apron would be located approximately 200 feet south of an active UP Railway railroad crossing that is signalized and has safety crossing arms. The driveway location is not visually obstructed for at least 1,000 feet along Clawiter Road in both directions (absent any train). Energy Commission staff concludes that the existing visually unobstructed distance from the project's proposed driveway, the operating signalized and safety crossing arms, and width of driveway apron would result in a less than significant hazard due to roadway and encroachment design for both construction and operational workforce-related traffic entering or leaving the site.

However, because Clawiter Road is only a two-lane roadway, deliveries by tractor-trailer combinations from the north could require the trucks to swing into the oncoming traffic lane, especially with extended or double trailers. Although truck deliveries would be limited, this condition, left unmitigated, could result in a significant hazard to oncoming vehicles and would constitute a potentially significant temporary impact under CEQA. The traffic control and implementation plan required in condition of certification **TRANS-1** would require prior coordination for deliveries by double trailers or of any hazardous materials. Normal deliveries would occur between 10 a.m. and 3:30 p.m. daily, with hazardous materials deliveries in the evenings or overnight, between 7:00 p.m. and 6:00 a.m. For deliveries from the north, a flagger would be available to stop any northbound traffic until the delivery truck has successfully cleared the oncoming lane and entered the facility. This condition of certification, along with other measures included in **TRANS-1** (see discussion above), would reduce the potential for a significant impact due to roadway and encroachment design, for both construction and operational truck traffic, to a less than significant level.

Linear Facilities

The Eastshore project would install approximately 1.1 miles of 115 kilovolt (kV) single-circuit overhead transmission line along new and existing Pacific Gas & Electric Company's (PG&E's) transmission corridors from the project site to PG&E's Eastshore Substation. Installation of new and replacement of 10-13 existing transmission pole structures may require widening of the existing rights-of-way (ROW), resulting in temporary traffic delays along Clawiter Road, south and east of the project site; Eden Landing Road, Production Avenue, and Investment Boulevard between the project site and the Eastshore Substation. Construction would not occur during normal commute hours and would be of limited duration at any one location between construction Month 5 and Month 13. No more than 500 feet of roadway length would be affected at one time and travel in both directions would be maintained. There would be no permanent alterations to roadways along the transmission line route. As identified in **TRANS-1**, a traffic control plan would be prepared in accordance with the Caltrans Manual on Uniform Traffic Control Devices and the WATCH Manual, which would ensure that the

applicant complies with all applicable transportation-related federal, state, and local LORS. **TRANS-3** would require the applicant to secure an encroachment permit from the City of Hayward Public Works Department for any work conducted within the public ROW. Implementation of the traffic control plan would minimize traffic impacts related to construction and maintenance of the linear transmission facilities to a less than significant level. Staff is also proposing condition of certification **TRANS-4** which would require that any road damaged by project construction would be repaired to original condition. This will ensure that any damage to a local roadway would not become a safety hazard to motorists.

Natural gas would be supplied to the proposed power plant by a connection to an existing PG&E natural gas pipeline (#153), located approximately 200 feet north of the project site, on the east side of Clawiter Road and north of the UP Railway tracks. PG&E would bore beneath the road and railroad tracks and install a 4½-inch pipe to the existing connection. Installation would have no impact on traffic existing roadways.

Operation Traffic Impacts and Mitigation

Operation Workforce Traffic

The proposed Eastshore project would employ approximately 13 full-time employees once operations are underway. Five (5) employees would work normal business hours (8:00 am until 5:00 pm), with the remaining eight employees working throughout the remainder of each day in rotating shifts (two employees per shift). This would generate a maximum of seven (7) new vehicle trips during the morning commute hours (7:00 a.m. through 9:00 a.m.) and seven (7) new vehicle trips during the evening commute (4:00 p.m. through 7:00 p.m.). Six (6) additional vehicle trips would occur during the remainder of the day. (EEC 2006, pp.8.10-18, 19) This is a de minimus increase in traffic during any time in the daily traffic cycle and would have a less than significant adverse impact on overall traffic counts, congestion, and LOS along any of the routes or roadway intersections workers would use to access the project site.

Operation Truck Traffic

The Eastshore facility is not a materials-intensive operation. Truck traffic after the completion of construction should not exceed 60 trips per month, with an average of two or fewer trips per day (see **Traffic and Transportation Table 5** below). This would include up to eight tanker truck deliveries of aqueous ammonia each month.

TRAFFIC AND TRANSPORTATION Table 5
Operational Truck Traffic

Delivery Type	Number and Frequency of Truck Trips*
Aqueous ammonia	16 per month
Lubricating oil	2 per month
Water Treatment Chemicals	4 per year
Cleaning chemicals	2 per month
Oily Water Waste Removal	8 per year
Trash Removal	2 per week
Sparing Replenishment	4 per year

Source: EEC 2006, p.8.10-19 * Each delivery counts as two trips

Although regular service vehicles and delivery of materials would generally arrive during normal business hours, all deliveries of hazardous materials would occur outside of normal commute times. The addition of this limited number of truck trips would have a de minimus effect on overall traffic counts, congestion, and LOS along any of the routes or roadway intersections normally used for these deliveries, except as indicated in **Transportation of Hazardous Materials** below.

Parking

Parking for all permanent employees, as well as pullouts for delivery vehicles, would be provided on-site, as identified in AFC Figure 2.2-1. A total of six standard parking spaces are proposed by the applicant. The City of Hayward Municipal Code §10-2.300 *et al* identifies the number of parking spaces required for various types of uses. Power plants are not listed in this code section. However, §10-2.300 indicates that uses not specifically listed shall provide the minimum off-street parking required for the most similar use. Because power plants were identified as a use similar to manufacturing in the Industrial Zoning District [COH 2001(b)], the parking space requirements for manufacturing, as identified in §10-2.350, would be the most appropriate. The code indicates that, for a building or structure with leasable bays of 20,000 square feet or greater, the minimum off-street parking required is one space for each 2,000 square feet of gross floor area. The Eastshore facility's main structure would be approximately 40,000 square feet in size, but this includes considerable square footage devoted to operational equipment needs and enclosure of industrial machinery. These areas have no public spaces. No comments were received from the City of Hayward Planning Department regarding their interpretation of the onsite parking space requirement for the proposed Eastshore facility. Therefore, using the formula of one parking space per each 2,000 square feet of gross floor area (not including the equipment footprint), the project would be required to provide a minimum of 5 parking spaces [COH(a), §10-2.350], including one ADA-compliant, van-accessible parking space. The control/ switchgear building and guard house total approximately 10,145 square feet, based on dimensions indicated in AFC Figure 2.2-1. The four 9' X 19' parking spaces, one 16' X 19' handicapped space, and a 26-foot wide travel lane would require approximate 3,458 square feet, less than one-tenth of an acre on a 6.22-acre site. The project site would have sufficient area to provide the required on-site parking.

Staff has proposed condition of certification **TRANS-2**, which requires the applicant to provide an operation parking plan to demonstrate compliance with the City of Hayward's Parking Regulations (Municipal Code §10-2.300 *et al*).

Emergency Access

Emergency access to the Eastshore facility would be through the main entrance on Clawiter Road. The facility is staffed 24 hours a day, 7 days a week, which would guarantee immediate access in case of an emergency. Because the farthest point of the facility structures is more than 150 feet from the encroachment onto Clawiter Road, the City of Hayward Municipal Code §10-1.1645(o)(8) requires a turnaround that would allow fire protection vehicles to turn around within the facility boundaries. The internal roadways would be designed as a closed loop around the inside of the facilities boundary. This would allow emergency vehicles to turn around near the entrance to the facility or circle around the entire facility. There are also three additional truck bays

along the roadway that would allow emergency vehicles to make a “T” turn and reverse direction (AFC Figure 2-2.1). The proposed 30-foot wide driveway encroachment onto Clawiter Road would provide a 41-foot turning radius and paved internal traffic lanes would be designed to accommodate double-trailer trucks (EEC 2007(d), pp.15-17). This would be sufficient to accommodate the length, width, and turning requirements of ladder trucks and other emergency vehicles.

Staff has proposed condition of certification **TRANS-2**, which includes provisions requiring compliance with the emergency access requirements of the Hayward Municipal Code, including access at all times for policy, fire, City/Energy Commission inspection, and utility or other health and safety-related vehicles, and installation of a gate-opening system, approved by the City of Hayward Policy Chief and Fire Marshal, to provide immediate access during an emergency response.

Transportation of Hazardous Materials

The applicant states that there would be deliveries of hazardous materials to the project site. Generally, only small qualities of hazardous materials would be used during the construction period (e.g. cleaning solvents, paint, asbestos containing materials, et cetera). No acutely toxic hazardous materials would be used on-site during construction.

During operation, trucks would periodically deliver and haul away aqueous ammonia, sulfuric acid, cleansing chemicals, lubricating oil and filters, oily rags, oil absorbent, water treatment chemicals, and laboratory waste. The applicant estimates a maximum of three truck trips per day, with an average of two or less truck trips per day to the site or 60 trips per month. The primary designated hazardous materials route for the Eastshore project is SR-92 to the Clawiter Road exit, then north along Clawiter Road to the proposed project site.

Specific sections of the California Vehicle Code and the California Streets and Highways Code ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

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

The project owner would be required to comply with all LORS governing the transport, storage, and use of hazardous materials. For a more detailed discussion on the handling and disposal of hazardous substances, see the **Hazardous Materials Management** section of this PSA.

Impacts to Navigable Airspace

The airspace surrounding the Hayward Executive Airport is subject to many restrictions and operational requirements to accommodate the high level of aircraft activity at numerous airports within the Bay area. The Hayward airport airspace extends approximately four nautical miles to the northeast and southwest, but only one nautical mile to the northwest due to potential conflicts with flights into and out of Oakland International Airport, especially commercial jet aircraft on final Instrument Landing System approach to Oakland International Airport Runway 29. Additionally, the Hayward airspace only extends from the surface to 1,500 feet Mean Sea Level (MSL), to provide adequate separation between aircraft using the Hayward airport and operations at Oakland and San Francisco. Noise abatement procedures play a significant role in the movement of aircraft within the Hayward airport airspace. Aircraft activity within the Hayward airspace is further constrained by noise abatement procedures designed to protect a number of residential developments to the north, northeast, and southeast of the Hayward airport (see **Traffic and Transportation Figures 4a-c**). This leaves the southwestern quadrant of the Hayward airport airspace as the only relatively unobstructed area for aircraft transit, maintenance flights, training procedures, and normal departures/arrivals.

Aircraft operating in the Hayward airport airspace must be in contact with the air traffic control (ATC) tower when it is in operation. However, the Hayward ATC tower only operates from 7:00 a.m. until 9:00 p.m. daily. During all other times, the airspace reverts to Class E airspace, which requires only those aircraft that are conducting instrument flights to remain in contact with ATC facilities, such as San Francisco Bay Approach Control, Oakland ATC tower, or Oakland Air Route Traffic Control Center. Other aircraft, operating under visual flight rules[3] (VFR), are not required to be in radio communication with any ATC facility and their flight paths need not conform to published instrument approach or departure patterns when operating within the Hayward airspace. Under VFR rules, aircraft are generally allowed to enter the standard pattern from any direction, provided it does not interfere with other aircraft or violate local noise abatement restrictions. Although the typical traffic pattern extends out a little less than a mile from the runways (**Traffic and Transportation Figure 5**), the actual tracks flown by aircraft entering and leaving the pattern may extend out 1.5 miles or more, depending on the type and volume of the traffic. Aircraft may also be held outside the pattern by the tower controllers to provide for additional spacing between aircraft or to avoid impacts on smaller aircraft from the turbulence created by larger aircraft landing at Hayward or commercial jetliners inbound to Oakland International Airport. The published pattern altitude for the Hayward Executive Airport is 600-800 feet MSL (approximately 550-750 feet AGL for fixed wing and 550 feet AGL for helicopters [CAC(a), p.2]). However, the minimum altitude for fixed wing aircraft outside the traffic pattern, in unobstructed airspace, is 500 feet MSL (approximately 450 feet AGL), except that all fixed wing aircraft must maintain at least 500 feet above any structure during normal flight. Aircraft taking off or landing, as well as helicopters, may fly lower [FAA(c)].

[3] Visual Flight Rules (VFR) identify conditions under which a pilot may fly without positive control from an ATC facility and can “see and be seen” by other pilots.

The proposed site for the Eastshore facility would be located approximately one mile south of the runways for the Hayward Executive Airport, in the southwestern quadrant of the Hayward airspace. This is within the boundaries of the Hayward Airport Approach Zoning Plan (AAZP) turning zone, as defined in §10-6.20 of the City of Hayward Airport Approach Zoning Regulations (see **Traffic and Transportation Figure 6**), and the Hazard Prevention Zone/General Referral Boundary (also known as the AIA) identified in the ALUPP (see **Traffic and Transportation Figure 7**). The proposed site is just outside the Hayward airport traffic pattern zone and a few hundred feet south of the downwind departure for Runway 28L, which follows the UP Railway tracks that run along the project's northeastern boundary (see **Traffic and Transportation Figure 4a**). It is also just south of the preferred helicopter arrival/departure route to the existing helicopter landing pad at the southern edge of the airport. Aircraft currently fly over or within 492 horizontal feet (within a 300 meter "gate[4]") of the proposed site, at altitudes below 1,000 feet AGL, more than 45 times per month. Many more flights, especially mid-field departures, skirt either side of the airspace above the site on a daily basis (HWD 2007). Flight altitudes identified in the aircraft tracks provided for April 2007 (HWD 2007) identify helicopter and single engine fixed wing aircraft transits between 505 - 919 feet AGL.

The proposed Eastshore facility is a gas-fired power plant that would create high velocity thermal plumes above fourteen (14), 70-foot high stacks. Energy Commission staff have determined that thermal plumes, using staff's 4.3 meters per second (m/s) velocity threshold[5], from the Eastshore project may, under certain weather conditions, disturb atmospheric stability to 480 feet AGL or higher (see **APPENDIX TT-1**, p.3). It should be noted that the calculation method staff used provides the "plume average" velocity for the area of the plume at a given height above the ground. The peak centerline velocity would be greater. Potentially, the maximum could be somewhere around a value of two times the average. Staff believes that peak centerline velocity could exceed 4.3 m/s well into and perhaps above the pattern altitude for the airport. This would result in turbulence with the potential to affect the maneuverability of aircraft flying over or in the immediate vicinity of the plumes at or below that altitude.

In January 2006, the FAA published a safety study report on aircraft over-flight of industrial exhaust plumes. Using a variety of data sources going back almost thirty years, FAA safety analysts concluded that, although the potential for risk is "acceptably small" (1×10^{-9} or less), "flight over or around plume generating facilities should be avoided as there is the *potential* (however low) for aircraft upset at close proximity to

[4] An aircraft penetration or analysis "gate", as identified in this analysis, is an imaginary "window in the sky" established in the Airport Noise and Operations Monitoring System (ANOMS) that allows the user to evaluate any aircraft that penetrates the gate for type, speed, altitude, and noise events. The gate for the Eastshore location was a circle with a radius of approximately 974 horizontal feet (300 meters), centered over the proposed project location. [CAC (2005(b), p.6; COH 2007(h)]

[5] This is based on staff's review of a 2004 safety circular (AC 139-05(0)), prepared by the Australian Government Civil Aviation Safety Authority, that noted "aviation authorities have established that an exhaust plume with a vertical velocity in excess of 4.3 meters per second (m/s) may cause damage to an aircraft airframe or upset an aircraft when flying at low levels" (CASA 2004). In their safety study on thermal plumes the FAA noted that they "do not necessarily approve/disapprove or warrant the data contained in the CASA AC 139-05." The safety team accepted "the information and data contained in AC 139-05 as a valid representation of hazardous exhaust velocities" (FAA 2006).

high velocity plumes" (FAA 2006). The FAA has advised staff that its safety study "is a statistical analysis of accident and incident databases. It is not based on actual flight tests. The risk to an aircraft flying through a plume is low but not nonexistent" (FAA 2007c). The safety experts who authored the report made several recommendations to further lower the risk associated with the over-flight of thermal plumes, including amending the Aeronautical Information Manual with wording to the effect that over-flight at less than 1,000 feet vertically of plume generating industrial sites should be avoided, and amending FAA Order 7400.2 to consider a plume generating facility a hazard to navigation when expected flights pass less than 1,000 feet above the top of the object (FAA 2006).

Staff agrees with the FAA recommendation that pilots should avoid direct over-flight of industrial plumes below 1,000 feet AGL. However, it is not feasible for aircraft to fly above 1,000 feet because the pattern altitude for Runway 10R/28L is limited to 600 feet due to over-flight of aircraft on approach to Oakland International Airport and cannot be raised (FAA 2007a). Furthermore, as the FAA stated in its September 25, 2007 letter on the RCEC[6], "the recommended mitigation to see and avoid the plumes when operating below 1000 feet is not reasonable for aircraft operating in a traffic pattern"(FAA 2007b). According to the FAA, "it is not reasonable to expect pilots to look for the exhaust stacks and cooling towers on the ground, then see and avoid any visible plumes while attending to their primary responsibility of safely operating the aircraft, looking for other aircraft in the pattern, and responding to Air Traffic Control instructions" (FAA 2007a). Staff notes that Eastshore thermal plumes would not be visible and could deceive pilots into thinking that no plume is present. In addition, pilots departing the traffic pattern after take-off from Runway 28L have their aircraft in a "nose up" configuration that limits visibility of objects/structures on the ground. Staff does not believe it is appropriate or reasonable to burden pilots with the additional task of "seeing and avoiding" the Eastshore facility during such critical times of flight.

Thus, staff concludes that the project site's proximity to the traffic pattern for the Hayward Executive Airport and the downwind departure route for Runway 28L would unreasonably complicate aircraft maneuverability. It would also limit the airspace available for aircraft transit, maintenance flights, training procedures, and normal departures/arrivals that currently occur relatively unimpeded within this portion of the Hayward airport airspace. This would be a significant adverse impact under CEQA that could not be avoided if the project were developed at the proposed location.

COMPLIANCE WITH LORS

Traffic and Transportation Table 6 provides a general description of applicable statutes, regulations and standards adopted by the federal government, the state of California, Alameda County, and the City of Hayward, pertaining to traffic and transportation, that are applicable to the project. Conditions of certification have been proposed established to make the project consistent with the LORS, where consistency is not already mandated by federal or state regulations. However, the project is

[6] The Russell City Energy Center (RCEC), a 600-megawatt, natural gas-fired, combined-cycle power plant, has been approved for a site approximately 3,000 feet west of the Eastshore location. The RCEC, which will be located approximately 1 ½ miles from the Hayward Executive Airport, would also generate high-velocity thermal plumes from its exhaust stacks and cooling tower.

inconsistent with §10-6 of the City of Hayward Municipal Code. This inconsistency cannot be mitigated or avoided if the project is implemented at the proposed location (see discussion below).

The City of Hayward Airport Approach Zoning Regulations were created to promote the health, safety and general welfare of the inhabitants of the City of Hayward by preventing the creation or establishment of airport hazards and the destruction or impairment of the utility of the airport and the public investment therein [HMC(c)] . As noted above, implementation of the project could create or establish a potential aviation hazard within the AAZP. The utility of an airport depends, in part, on the safe and efficient movement of air traffic and use of the surrounding airspace. The Hayward airspace is complex and heavily congested and is constrained to an altitude of 1,500 feet MSL by flights arriving and departing Oakland and San Francisco International Airports. Noise abatement procedures further limit use of the airspace to the north and east and only one horizontal mile of airspace is available to the north, due to the airport's proximity to Oakland International Airport. This only leaves the southwest quadrant of the Hayward airspace relatively unobstructed. The presence of the Eastshore project at the proposed site would add a new obstruction to the only quadrant of airspace that is relatively unconstrained for aircraft operations.

TRAFFIC AND TRANSPORTATION Table 6
Project Compliance with Adopted Traffic and Transportation LORS

Applicable Law	Description	Consistency
Federal		
Code of Federal Regulations, Title14, Section 77 (14 CFR 77)	This regulation establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversees the development of antenna farm areas.	Consistent as proposed. The FAA has issued a "Determination of No Hazard to Air Navigation", which indicated that the project's physical structures would not adversely affect flight within navigable airspace. [FAA(c)].
Code of Federal Regulations, Title 49, Subtitle B	49 CFR Subtitle B includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and specifies safety measures for motor carriers and motor vehicles who operate on public highways.	Consistent as proposed. Actions proposed as part of the proposed project are consistent with the applicable regulatory requirements. Enforcement of these regulations the responsibility of state and local law enforcement agencies, and state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., Alameda County or City of Hayward Public Works).
State		
California Vehicle Code (CVC), Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14.1, Chap. 1 & 2; Div. 14.8; & Div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.	Consistent as proposed. Project elements appear consistent with regulatory requirements. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.
California Streets and Highway Code, Divs. 1 & 2, Chaps. 3 & 5.5	Includes regulations for the care and protection of State and county highways, and provisions for the issuance of written permits.	Consistent as proposed. Project elements appear consistent with regulatory requirements. Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.
Local		
Alameda County Alameda County Airport Land	(California Public Utilities Code §§21001 et seq, relating to the	Inconsistent. Project elements appear consistent with the

Use Policy Plan (ALUPP)	State Aeronautics Act.) The Alameda County Airport Land Use Policy Plan (ALUPP) provides for the orderly growth of airports and the area surrounding the airports within the jurisdiction of the Alameda County Airport Land Use Commission (ACALUC), excluding existing land uses. Hayward Executive Airport is within the ACALUC's jurisdiction. Noise and safety are the two fundamental compatibility concerns identified in the statutes. Impacts of aircraft overflights in locations beyond the normally mapped noise contours are addressed. Safety compatibility policies address both protection of people and property on the ground near airports and protection of airport airspace from obstructions and other hazards to flight. The Alameda County ALUPP works in concert with the Hayward General Plan and Zoning Codes, and the Hayward Executive Airport Master Plan.	safety elements and hazards to flight. However, FAA recommends that pilots avoid over-flight of industrial plume generating sites below 1,000 feet AGL. This would result in a disruption of normal flight patterns and maneuverability over the project site. (See the **LAND USE** section of this FSA for further discussion of the project's land use compatibility.)
<u>City of Hayward</u>		
General Plan (revised 2002) – Circulation Element	The Hayward General Plan contains seven elements and is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within City of Hayward jurisdiction. The Circulation Element of the Hayward General Plan discusses and analyzes the movement of people and goods through and around the city. The focus is on the system of freeways, local roads, bus and rail transit, and bicycle and pedestrian routes to determine the most effective design possible while enhancing the community and protecting the environment. Bicycle facilities are addressed in the Bicycle Master Plan (1997) and Hayward Executive Airport Master Plan (2002). Consistent with state law, the Circulation	<u>Consistent as conditioned.</u> Although the Hayward City Council has issued an advisory determination that the proposed Eastshore project is inconsistent with the City's General Plan, transportation-related elements were not cited as part of that determination. All affected roadways would remain at or above an LOS D (Policy 11, Strategy 1). The traffic control and implementation plan required by **TRANS-1** would require staggered work hours to distribute the traffic load (Policy 4, Strategy 3). It would also require trucks to use designated routes rather than local streets and prohibit overnight and other specified truck parking activities in residential areas (Policy 14, Strategy 3). Therefore, the project would be consistent with

	and Land Use Elements complement and support one another to provide a balance between land uses and the transportation facilities that serve them.	all applicable transportation-related aspects of the City of Hayward General Plan. The Hayward Executive Airport Master Plan has no elements that are applicable to this project.
Municipal Code Chapter 7, Article 1 – Property Developers, Obligations as to Streets Chapter 7, Article 2 – Disturbance of Streets Chapter 10, Article 2 – Off-Street Parking Regulations Chapter 10, Article 1, Section 10-1.1600 – Industrial District (I) Chapter 10, Article 6 - Airport Approach Zoning Regulations	Defines the requirements, policies, and procedures to acquire pubic rights-of-way and construct public improvements in connection with the development of property. Regulates the disturbance of existing streets and utility corridors during construction activities. The section of the zoning code strives to relieve congestion; provide for adequate parking, loading and maneuvering areas; protect the appearance and land uses of the area; provide alternative parking options to encourage the development of business and industry; and encourage alternative forms of transportation. Development Plan Standards includes standards for ingress/egress access, truck loading and parking areas for new development projects. The Zoning Ordinance includes permitted uses and development requirements for the "Industrial Zone" designation on the project site. This code section (Hayward City Council Resolution #64-038; 9/15/64) was designed to prevent the creation or establishment of airport hazards, thereby protecting the lives and property of the users of Hayward Executive Airport and the occupants of the land in its vicinity, and preventing destruction or impairment of the utility of the airport and the public investment therein.	Consistent as conditioned. The traffic control and implementation plan required by **TRANS-1** would require compliance with all City of Hayward code requirements for construction and use of streets, parking areas, and traffic management. **TRANS-2** would require adequate emergency access during both construction and operation. Therefore, the project would be consistent with all applicable Municipal Code requirements relating to streets, parking, and circulation. Inconsistent. The project-generated thermal plumes could present a hazard to aircraft flying at pattern altitude during certain weather conditions. The project is, therefore, inconsistent with the purpose expressed in §10-6.00 of this regulation.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [CCR 2006, §15065(A)(3)].

RUSSELL CITY ENERGY CENTER PROJECT

The RCEC, a 600-megawatt, natural gas-fired, combined-cycle power plant, has been approved for a site approximately 3,000 feet west of the Eastshore location. If both projects are certified, their proximity to one another would potentially result in the following cumulative impacts:

Workforce Traffic Impacts During Construction

If certified, the Eastshore project would take approximately 18 months to complete construction, beginning in the fourth quarter of 2007 and commencing commercial operation by the second quarter of 2009. The RCEC project is expected to begin in the second quarter of 2008 and end during the second quarter of 2010, a total of 24 months. Although peak construction periods are not expected to overlap, the addition of an average of 620 vehicle trips per day (see summary of the RCEC construction traffic in **Traffic and Transportation Table 7** below; RCEC 2007) combined with an average of 256 vehicle trips per day generated by the Eastshore project (see **Traffic and Transportation Table 5**) along the same roadway segments has the potential to result in a degradation of LOS and increased traffic at several intersections along Clawiter Road and Industrial Blvd between the project sites and SR-92 (see **Traffic and Transportation Tables 8 and 9** below).

The applicant has indicated a willingness to designate Industrial Blvd. as the primary construction route for the Eastshore project, which would prevent the deterioration of the Clawiter Rd/Eden Landing Rd. intersection with SR-92 from being degraded from LOS E (marginal) to LOS F (unacceptable). However, without mitigation, both routes would result in degradation of the LOS at the affected Industrial Blvd. and Clawiter Rd. intersections. However, proposed RCEC condition of certification **TRANS-1** (RCEC 2007, pp.4.10-20, 21) and proposed **TRANS-1** for the Eastshore project require workforce arrival/departure and materials delivery outside normal commute times. Implementation of these conditions of certification for both projects would reduce any potential traffic-related cumulative impacts to a less than significant level

TRAFFIC AND TRANSPORTATION Table 7
RCEC Trip Generation Summary--Construction Phase

	Average Daily Round Trips	Peak Daily Round Trips	Morning Peak Hour		Evening Peak Hour	
			In	Out	In	Out
Workers	292	585*	585	0	0	585
Delivery Trucks	14	27	0	0	0	0
Heavy Vehicles & Trucks	6	26	0	0	0	0
Total	**310**	**638**	**585**	**0**	**0**	**585**

Source: RCEC 2006a, Table 2.4-3, pg. 2-17
Forecasted Number of Commuting Workers, RCEC 2006a, Table 3.11-4, pg. 3-157

TRAFFIC AND TRANSPORTATION TABLE 8
Cumulative Construction Impacts on LOS For Intersections Affected By Eastshore and RCEC Projects*

INTERSECTION	EXISTING LOS (AM)	LOS DURING CONSTRUCTION (AM)	EXISTING LOS (PM)	LOS DURING CONSTRUCTION (PM)
No Change to I-880 or SR-92 LOS				
Clawiter Rd. and West St.	B	B	B	B
Clawiter Rd. and Industrial Blvd	A	A	B	B
Clawiter Rd. and Depot Rd.	A	A	A	A
Industrial Blvd. and Depot Rd.	B	B	B	B
Clawiter Rd/Breakwater Ave. at SR-92 Westbound ramps	B	**C**	B	B
Clawiter Rd/Eden Landing Rd at SR-92 Eastbound ramps	C	**D**	E	**F**
Industrial Blvd/Cryer St. at SR-92 Westbound ramps	B	B	C	C
Clawiter Rd. at the Project Site Entrance	A	**C**	A	**D**
Clawiter Rd. at the Temporary Parking Lot Entrance	A	**C**	A	**D**

* Clawiter Road designated as primary access route for Eastshore traffic.
Sources: EEC 2006, pp.8.10-11, 14, 16-17; EEC 2007, pp.18-21; Energy Center staff analysis
BOLD indicates a change in the LOS from existing conditions.

TRAFFIC AND TRANSPORTATION TABLE 9
Cumulative Construction Impacts on LOS For Intersections Affected By Eastshore and RCEC Projects*

INTERSECTION	EXISTING LOS (AM)	LOS DURING CONSTRUCTION (AM)	EXISTING LOS (PM)	LOS DURING CONSTRUCTION (PM)
No Change to I-880 or SR-92 LOS				
Clawiter Rd. and West St.	B	B	B	B
Clawiter Rd. and Industrial Blvd	A	A	B	B
Clawiter Rd. and Depot Rd.	A	**B**	A	**C**
Industrial Blvd. and Depot Rd.	B	**C**	B	B
Clawiter Rd/Breakwater Ave. at SR-92 Westbound ramps	B	B	B	B
Clawiter Rd/Eden Landing Rd at SR-92 Eastbound ramps	C	C	E	E
Industrial Blvd/Cryer St. at SR-92 Westbound ramps	B	**D**	C	**D**
Clawiter Rd. at the Project Site Entrance	A	**C**	A	**D**
Clawiter Rd. at the Temporary Parking Lot Entrance	A	**C**	A	**C**

* Industrial Blvd. designated as primary access route for Eastshore traffic.
Sources: EEC 2006, pp.8.10-11, 14, 16-17; EEC 2007, pp.18-21; Energy Center staff analysis
BOLD indicates a change in the LOS from existing conditions.

Workforce Traffic Impacts During Operations

Both the Eastshore and RCEC projects would employ a limited number of workers once operations commence. Eastshore expects to have 13 employees and RCEC estimates 27 workers. Traffic volumes generated by both the Eastshore and RCEC projects during the operations phase would have a less than significant individual and cumulative effect on current or projected traffic counts, congestion, and the LOS along roadways serving the project.

Impacts on Navigable Airspace

Certification of both the Eastshore and RCEC projects would result in the construction and operation of two power plants within the southwest quadrant of the Hayward Executive Airport's airspace. The RCEC, which will be located approximately 1 ½ miles from the Hayward airport, would also generate high-velocity thermal plumes from its exhaust stacks and cooling tower.

On October 9, 2007, staff received a letter from the FAA regarding the proposed Eastshore facility that noted there would be a cumulative affect on aircraft operations when considering the project and the RCEC. FAA wrote: "The cumulative affect of both facilities within the confines of the Category B VFR [Visual Flight Rules] airport traffic pattern and the VRF arrival and departure area would make the mitigation [to see and avoid the plumes] impractical. Due to the low visual affects of the RCEC and Eastshore

plumes, pilots would be required to divert their attention from the traffic pattern and safe operation of the aircraft to acquire visual sighting of both facilities on the ground, then maneuver the aircraft around both plumes. The mitigation would be unreasonable and in some cases unattainable" (FAA 2007c).

On November 1, 2007, staff received a letter from the California Department of Transportation, Division of Aeronautics (Caltrans), addressing the potential hazards to navigable airspace as a result of the proposed Eastshore project site's proximity to Runway 10R/28L. Caltrans staff is concerned that "the proposed creation of another power plant, and the associated high velocity thermal plumes within the traffic pattern zone buffer area of the Hayward Executive Airport (HWD), would compound and magnify the problems created by the approval of the Russell City Energy Center (RCEC)" (Caltrans 2007c). Caltrans staff does "not believe that the combined effects of thermal plumes created by two proposed power plants can be mitigated to the degree that flight safety would not be compromised. We do not agree that the recommended mitigation measures for [RCEC] are satisfactory for [Eastshore], as this would only further restrict a pilot's ability to maneuver an aircraft while flying to or from the airport. Aircraft pilots should not be subjected to avoid flying in areas while configuring an aircraft for landing at or departing the airport. We support the relocation of the plant at a sufficient distance that would not negatively impair a pilot's ability to control or maneuver his/her aircraft."

In conjunction with the mitigation for the RCEC (no over-flight of the project site below 1,000 feet AGL), and the FAA's recommendation that this be applied to Eastshore as well (FAA 2007c), the cumulative effect of both projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. Staff concurs with FAA and Caltrans that it would be impractical and in some cases unattainable for pilots to see and avoid both power plants while attending to their primary responsibility of safely operating their aircraft. This would be a significant cumulative impact under CEQA that could not be avoided if the project were developed at the proposed location.

I-880/SR-92 Interchange Reconstruction Project

The Caltrans I-880/SR-92 project would continue throughout the construction periods for both Eastshore and RCEC projects and would affect several of the intersections along Clawiter Rd. and Industrial Blvd. that would be used by workforce and truck traffic from both projects. However, as indicated in **Traffic Impacts** above, if the TMP proposed by Caltrans for this project is implemented, lane and ramp closures would be limited to night and off-peak hours (Caltrans 2003, p.3-135) and existing traffic patterns along the affected sections of the roadways would not be significantly impacted.

Energy Commission staff finds that the project, in conjunction with operation of the proposed RCEC project, would not have a cumulatively considerable impact on ground traffic or the LOS of affected roadways, provided all conditions of certification are fully implemented. Energy Commission staff has also considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in the project vicinity in its impact analysis. There are no significant adverse traffic and transportation-related cumulative impacts, and therefore, no traffic-related environmental justice issues. However, operation of the Eastshore facility, concurrent with the RCEC project,

would have a cumulatively considerable adverse effect on the utility of the Hayward Executive Airport by further limiting the use of a significant portion of the airport's usable airspace. This would be a significant adverse impact under CEQA that could not be avoided or mitigated if both projects were implemented at the proposed locations or anywhere within the airspace of the Hayward Executive Airport.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received numerous comments from the city of Hayward and the general public regarding the suitability of the Clawiter Road location for the proposed project. In addition, the Hayward City Council has passed a Resolution, with supporting reports from the City of Hayward Planning Department (COH 2007b, c, d), that determined the Eastshore project to be inconsistent with the Hayward General Plan and Industrial Zoning District.

On October 9, 2007, staff received a letter from the city of Hayward. This letter did not contain any comments about traffic and transportation.

From a traffic and transportation perspective, there have been three primary concerns expressed during the course of staff's review of the Eastshore project:

A. How would construction traffic from the proposed project impact existing congestion along Clawiter Road during normal commute hours, especially when combined with workforce traffic from the proposed Russell City project?

   As discussed in **Construction Traffic Impacts** and **Cumulative Impacts** sections above, potentially significant impacts from the influx of workforce construction traffic would be reduced to a less than significant level with the full implementation of condition of certification **TRANS-1**, which would include a requirement that workers arrive and depart outside normal peak commute hours and that materials delivery and transfers only occur outside those hours as well.

B. How would construction traffic affect the AC Transit bus schedules and use of the holding yard?

   AC Transit staff has indicated that the workforce traffic and materials delivery/transfers resulting from the Eastshore project, individually or cumulatively with the Russell City project, would not interfere with bus schedules or use of any holding yard or maintenance activities, provided all proposed conditions of certification are fully implemented.

C. Would the Eastshore project negatively affect aircraft safety or operations within the Hayward Executive Airport airspace?

   As noted in the **Operations Impacts** and **Cumulative Impacts** sections above, it is Energy Commission staff's opinion that the Eastshore project, alone and in conjunction with operation of the proposed RCEC project, would have a significant adverse effect on operations within the Hayward Executive Airport airspace.

Staff has received written comments on the PSA from the FAA, Caltrans, Division of Aeronautics, Port of Oakland, Alameda County Airport Land Use Commission, and the California Pilots Association. In addition, staff received numerous comments from the city of Hayward and the public at the PSA Workshop. Staff shares many of the concerns expressed. Please see the **Operations Impacts** and **Cumulative Impacts** sections of this analysis for a detailed discussion.

The City of Hayward expressed its concerns at the PSA workshop about a second power plant with impacts to the city's airport and aircraft patterns. The City finds the project unacceptable and feels that there is no possible mitigation to deal with those impacts.

On October 17, 2007, the Alameda County Airport Land Use Commission, after discussing its concerns regarding the Eastshore project's thermal plumes relative to aviation safety at the Hayward Executive Airport, passed a resolution recommending that an alternate site for the proposed project be found outside of the Airport Influence Area (ACALUC 2007).

The Port of Oakland supports locating the project to an alternate site where it would not result in impacts on air traffic patterns (POR 2007). Port staff recommends that the Energy Commission, along with the FAA and Caltrans Aeronautics pursue developing policies and guidelines that restrict constructing power plants within a specified radius of an operating airport to reduce the potential for conflicts between airport use and the hazards that thermal plumes present.

Staff also received a letter from the California Association of Pilots that expresses their concern about the Eastshore project's impact on airport operations.

Public comments were made during the PSA workshop on September 6, 2007 expressing concern that a special security Temporary Flight Restriction (TFR) and Notice to Airman (NOTAM) issued by the FAA in the interest of national security, which strongly advises pilots to avoid, to the extent practicable, the airspace above or in proximity to power plants, could impact flight operations at Hayward Executive Airport and Oakland International Airport. This concern was also expressed by the Port of Oakland in their letter to staff (POA 2007). These concerns were a reaction to the discussion of this issue in the PSA. Subsequent to the publication of the PSA, staff was advised by the FAA that the TFR/NOTAM does not apply to aircraft landing and departing from an airport, or those involved in touch-and-go and low approach maneuvers. Aircraft in a traffic pattern are not considered to be loitering (FAA 2007d). Thus, if the Eastshore facility is approved at the proposed location, aircraft approaching or departing from Hayward Executive Airport or Oakland International Airport would not be restricted by this TFR/NOTAM.

In response to another public comment, staff believes that the FedEx cargo planes descent patterns would not be affected by the project's operation because the cargo planes are large aircraft and they would be high enough above ground (i.e. 2,000 feet AGL) when flying over the Eastshore facility, so as not to be affected by the project's plumes.

Staff received an e-mail from Andrew Wilson on October 11, 2007 about a proposal to build four 199-foot antennas at the end of West Winton Avenue, about 8,000 to 9,000 feet northwest of the Eastshore site, and 1.2 miles west of the Hayward Executive Airport. Mr. Wilson asked whether there would be a cumulative affect in combination with the RCEC and Eastshore power plants. Energy Commission staff reviewed the Determination of No Hazard to Air Navigation issued by the FAA. Based on the FAA's determination, staff does not believe there would be a cumulative impact on aircraft operations in conjunction with the RCEC and Eastshore projects.

CONCLUSIONS AND RECOMMENDATIONS

- Staff agrees with the Federal Aviation Administration (FAA) recommendation that aircraft should not fly over the Eastshore Energy Center (Eastshore) site below 1,000 feet above the ground because thermal plumes could present a potential hazard to aircraft (small planes and helicopters). However, it is not feasible for aircraft to fly above 1,000 feet because the pattern altitude for the Hayward Executive Airport (Runway 10R/28L) is limited to 600 feet due to over-flight of aircraft on approach to Oakland International Airport and cannot be raised.
- Staff agrees with the California Department of Transportation, Division of Aeronautics (Caltrans) recommendation. Concurring with FAA regarding the project's thermal plumes and corresponding hazard, Caltrans recommends the Eastshore facility be located at a site sufficiently distant from the Hayward Executive Airport (Runway 10R/28L) to avoid impairing pilots' ability to control or maneuver their aircraft. The Alameda County Airport Land Use Commission passed a resolution recommending that the Eastshore facility be located outside of the Airport Influence Area for the Hayward airport.
- The project site's proximity to the traffic pattern for the Hayward Executive Airport and the downwind departure route for Runway 28L would unreasonably complicate aircraft maneuverability. It would also limit the airspace available for aircraft transit, maintenance flights, training procedures, and normal departures/arrivals that currently occur relatively unimpeded within this portion of the Hayward airport airspace. This would be a significant adverse impact under CEQA that could not be avoided if the project were developed at the proposed location.
- The cumulative effect of the Eastshore and Russell City Energy Center (RCEC) projects on Hayward airport airspace increases the potential for serious impairment to the utility of the airport by increasing the complexity of the airspace. FAA and Caltrans agree that it is impractical and in some cases unattainable for pilots to see and avoid both power plants while attending to their primary responsibility of safely operating their aircraft. The project's contribution to this significant adverse impact would be cumulatively considerable.
- The project would not conform with the purpose of the City of Hayward Airport Approach Zoning Regulations (Hayward Municipal Code) because project-generated thermal plumes could present a hazard to aircraft flying at pattern altitude. Therefore the project would not conform to all applicable laws, ordinances, regulations and standards pertaining to traffic and transportation.

- During construction, potential impacts created by workforce traffic, truck traffic, and the movement of workers and materials between the temporary parking/laydown area would be reduced to a less than significant level by condition of certification **TRANS-1**. This condition provides for preparation, approval, and implementation of a construction traffic control and implementation plan that would, among other provisions, specifically schedule workers, deliveries, and construction-related traffic outside of normal commute hours.
- During operation, workforce and truck traffic to and from the facility is not expected to result in a substantial increase to congestion, deterioration of the existing level of service (LOS), or creation of a traffic hazard during any time in the daily traffic cycle. It would have a less than significant adverse impact along any of the routes or roadway intersections that would be used to access the project site.
- The Eastshore project, in conjunction with construction and operation of the proposed RCEC project, would not have a cumulatively considerable impact on traffic or the LOS of affected roadways, provided all conditions of certification for both projects are fully implemented.

If the California Energy Commission elects to grant certification for this project, Energy Commission staff is proposing four conditions of certification to address the project impacts associated with ground transportation.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall prepare a traffic control and implementation plan for the project and its associated facilities, containing, as proposed by the applicant:

- A Traffic Management Plan (TMP) addressing the movement of vehicles and materials, including arrival and departure schedules, designated workforce and delivery routes, hazardous materials delivery schedules and coordination with Caltrans, and other traffic-related activities and resulting impacts during both construction and operation of the proposed facility.
- A Heavy Haul Plan (HHP), addressing the transport and delivery of heavy and oversized loads requiring permits from Caltrans or other state and federal agencies.

The project owner shall consult with the City of Hayward Public Works Department and Caltrans (if applicable) in the preparation of the traffic control and implementation plan and shall submit the proposed traffic control plan to the City of Hayward Public Works Department and Caltrans (if applicable) in sufficient time for review and comment, and to the Energy Commission's Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction. The traffic control plan shall include all elements normally required for review and permitting of a similar project. The project owner shall provide a copy of any written comments from the City of Hayward or Caltrans and any changes to the traffic control plan to the CPM prior to the proposed start of construction.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant project site or its associated easements, the project owner shall submit the proposed traffic control and implementation plan to the City of Hayward Public Works Department and Caltrans for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the City of Hayward and Caltrans requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from either the City of Hayward or Caltrans, along with any changes to the proposed development plan, to the CPM for review and approval.

TRANS-2 The project owner shall consult with the City of Hayward in the preparation of a parking and staging plan for the pre-construction, construction, and operation phases of the project and shall submit the parking plan to the City of Hayward Planning Department in sufficient time for review and comment and to the Energy Commission's Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction. The project owner shall provide a copy of any written comments from the City of Hayward or Caltrans and any changes to the traffic control plan to the CPM prior to the proposed start of construction.

The parking plan shall include all elements normally required for review and permitting of a similar project. The parking plan shall also include a policy, to be enforced by the project owner, stating all project-related parking would occur on-site or in designated off-site parking areas as shown on the plan.

The parking plan shall provide a plot plan showing the location of the proposed parking area(s); parking spaces, including ADA-compliant, van-accessible spaces; travel aisles and circulation patterns, car/van pool loading and unloading area(s), signage, height restrictions, and any other City of Hayward standards. Dimensions shall be shown for all parking spaces, travel lanes, encroachments, loading/unloading ramps, and turning radii, in accordance to the requirements stipulated in the applicable City of Hayward parking standards

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant project site or its associated easements, the project owner shall submit the proposed parking and staging plan to the City of Hayward Public Works for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the City of Hayward requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the City of Hayward, along with any changes to the proposed development plan, to the CPM for review and approval.

TRANS-3 Prior to any ground disturbance or obstruction of traffic (e.g., detours, temporary delays) within any public road, easement, or right-of-way, the

project owner or its contractor(s) shall coordinate with the City of Hayward or Alameda County Public Works Department and Caltrans (if applicable) and obtain all required permits (e.g., encroachment). All activities by the project owner or its contractor(s) shall comply with the applicable requirements of any affected local jurisdiction and Caltrans.

Verification: Prior to ground disturbance or interruption of traffic in or along any public road, easement, or right-of-way, the project owner shall provide copies of all permit(s) received from Caltrans or other affected jurisdiction to the CPM. In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

TRANS-4 The project owner shall restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities to original or near original condition in a timely manner.

Prior to the start of site mobilization, the project owner shall consult with Alameda County, the City of Hayward, and Caltrans (if applicable) and notify them of the proposed schedule for project construction. The purpose of this notification is to request the local jurisdiction(s) and Caltrans consider postponement of public right-of-way repair or improvement activities in areas affected by project construction until construction is completed and to coordinate any concurrent construction-related activities that are planned or in progress and cannot be postponed with the project owner.

Verification: Prior to the start of site mobilization, the project owner shall photograph or videotape all affected public roads, easements, and right-of-way segment(s) and/or intersections and shall provide the CPM, the affected local jurisdiction(s), and Caltrans (if applicable) with a copy of these images.

Within 60 calendar days after completion of construction, the project owner shall meet with the CPM, the affected local jurisdiction(s), and Caltrans (if applicable) to identify sections of public right-of-way to be repaired. At that time, the project owner shall establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide a letter signed by the affected local jurisdiction(s) and Caltrans stating their satisfaction with the repairs to the CPM.

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FAA 2007d. E-mail from David Butterfield, Flight Standards, Western Region, to Eric Knight, California Energy Commission, October 16, 2007.

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APPENDIX TT-1: PLUME VELOCITY ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Eastshore Energy Center (Eastshore) reciprocating engines and radiator exhaust stack plume velocities. Staff completed calculations to determine the worst-case vertical plume velocities at different heights above the stacks using the applicant's proposed engine and radiator design.

PROJECT DESCRIPTION

The proposed project would utilize fourteen Wartsila model 20V34SG natural gas-fired reciprocating engine – generator sets and two engine cooling radiators.

PLUME VELOCITY CALCULATION METHOD

Staff has selected a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for the Eastshore exhausts. The calculation approach, which is also known as the "Spillane approach", used by staff is limited to calm wind conditions, which are the worst-case wind conditions. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead calm wind (i.e. wind speed = 0) conditions:

(1) $(V*a)^3 = (V*a)_o^3 + 0.12*F_o*[(z-z_v)^2-(6.25D-z_v)^2]$

(2) $(V*a)_o = V_{exit}*D/2*(T_a/T_s)^{0.5}$

(3) $F_o = g*V_{exit}*D^2*(1-T_a/T_s)/4$

(4) $Z_v = 6.25D*[1-(T_a/T_s)^{0.5}]$

Where: V = vertical velocity (m/s), plume-average velocity
a = plume top-hat radius (m, increases at a linear rate of $a = 0.16*(z- z_v)$
F_o= initial stack buoyancy flux m^4/s^3
z = height above ground (m)
z_v= virtual source height (m)
V_{exit}= initial stack velocity (m/s)
D = stack diameter (m)
T_a= ambient temperature (K)
T_s= stack temperature (K)
g = acceleration of gravity (9.8 m/s^2)

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where z > 6.25D) and at the end of the plume merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity at the plume centerline, based on a standard Gaussian profile (bell curve), would be about two

times higher than the plume-average velocity. As can be seen the stack buoyancy flux is a prominent part of Equation (1). The calm condition calculation basis clearly represents the worst-case conditions, and the vertical velocity will decrease substantially as wind speed increases.

For multiple stack plumes, where the stacks are equivalent, the multiple stack plume velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best Paper as follows:

(5) $V_m = V_{sp} * N^{0.25}$

Where: V_m = multiple stack combined plume vertical velocity (m/s)
V_{sp} = single plume vertical velocity (m/s), calculated using Equation (1)
N = number of stacks

Staff notes that this simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology as given in data results presented in the Best paper (Best 2003). However, the Best paper does not present the multiple stack calculations in a manner that has allowed staff to determine the exact methodology and duplicate the results shown in the paper.

The applicant has provided a separate plume velocity analysis, revised after a data response workshop (Eastshore 2007), noted to be based on the "Spillane approach" as presented in the "Aviation Safety and Buoyant Plumes" paper (Best 2003). However, the applicant's plume velocity calculations do not actually reflect the Spillane approach as presented in this paper.

VERTICAL PLUME VELOCITY ANALYSIS

The vertical plume velocities were calculated for two specific conditions each for the engines and the radiators. The ambient and exhaust conditions for the engines and radiator, operating at full load, are provided below in **Plume Velocity Table 1**.

PLUME VELOCITY Table 1
Engine and Radiator Parameters

Case	Engine		Radiator	
	32°F	59°F	32°F	59°F
Stack Height ft (m)	70 (21.3)		20 (6.1)	
Stack Diameter ft (m)	4 (1.21)		3 (0.91) – 252 openings	
Stack Velocity ft/s (m/s)	73.2 (22.3)	73.1 (22.3)	33 (10.1)	33 (10.1)
Exhaust Temperature F (K)	698 (643)	695 (641)	59.2 (288)	87.6 (304)

Source: EEC 2006, Eastshore 2007; staff energy balance for radiator exhaust temperatures.

The engines are aligned in a row, with a 130-foot separation between two groups of seven and a 36-foot separation between a group of three and four within each group of seven and a minimum separation of 18 feet, as measured from the center of each stack. For worst case modeling purposes, the engines will be modeled assuming seven stacks form a merged plume.

The two rectangular radiators are separated by approximately 80 feet, but the 252 exhaust openings in each radiator have very little separation. Therefore, for worst case modeling purposes, the radiator is modeled as a single equivalent stack with a diameter of 47.6 feet, but the two radiator plumes are not assumed to merge. Using the Spillane approach, the plume velocity at different heights above ground was determined. Staff's calculated plume velocity values are provided in **Plume Velocity Table 2.**

PLUME VELOCITY Table 2
Engine and Radiator Predicted Plume Velocities

	Engine Plume Velocity (m/s)		Radiator Plume Velocity (m/s)	
Height (ft)	**32°F**	**59°F**	**32°F**	**59°F**
300	4.44	4.38	5.20	5.20
400	3.91	3.85	4.44	4.44
500	3.57	3.51	4.00	4.00
600	3.32	3.27	3.70	3.69
700	3.13	3.08	3.47	3.47
800	2.98	2.93	3.30	3.29
900	2.85	2.81	3.15	3.15
1,000	2.74	2.70	3.03	3.03
1,100	2.65	2.61	2.93	2.93
1,200	2.57	2.53	2.84	2.84
1,300	2.50	2.46	2.76	2.76
1,400	2.43	2.40	2.69	2.69
1,500	2.37	2.34	2.62	2.62
1,600	2.32	2.29	2.56	2.56
1,700	2.27	2.24	2.51	2.51
1,800	2.23	2.19	2.46	2.46
1,900	2.19	2.15	2.42	2.41
2,000	2.15	2.11	2.37	2.37

Source: Staff calculations.

As explained in the Transportation and Traffic section, a vertical velocity of 4.3 meters per second (m/s) has been established as the critical velocity of concern to light aircraft. For the engine cases, the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 320 feet and 310 feet, respectively, for the 38°F and 59°F operating cases. This indicates that the plume velocity of the engine exhausts is not a very strong function of ambient temperature. For the radiator cases, the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 430 feet for both operating cases. This indicates that the plume velocity for the radiators is also not a strong function of ambient temperature.

As noted previously, the applicant provided a separate plume velocity analysis for the engines as part of Data Response 2, #70 (Eastshore 2007). The applicant predicted that the vertical plume velocity from the combined engine stacks (assuming all fourteen combined) would drop below 4.3 m/s at a height of 202 feet, while Energy Commission staff's analysis of the drop below 4.3 m/s for all fourteen stacks combined is estimated at a height of 480 feet. Staff's calculated plume velocity values are quite a bit higher than those calculated by the applicant. The difference in staff's results and the applicant's results is in the equations used and what they represent. The equation used by the applicant, although purported to be the Spillane approach, did not consider the plume buoyancy properly and is essentially a conservation of momentum equation and is expressed as follows:

(6) $V = V_{exit}*D/[2*0.16*(z-h-z_v)]$, where h=stack height and z_v is calculated by Eq. (4)

This equation does not include the buoyancy flux, so it will not properly predict plume rise for buoyant sources. This equation was also used for a similar analysis of the Russell City (01-AFC-7C) exhausts. However, after staff's questions regarding this calculation method, the Russell City applicant contracted Katestone Environmental of Australia to provide an analysis based on a proprietary model developed from the "Spillane approach" (Katestone 2007). Staff's calculations were found to agree with the calm wind predications presented in the Katestone report for Russell City. The analysis comparing the Katestone report results and staff's results for Russell City are presented in the Russell City Amendment Staff Assessment (CEC 2007).

The Eastshore exhaust plumes have two forms of energy, mechanical energy (momentum) and thermal energy (buoyancy), and both forms of energy need to be considered in calculating plume vertical velocities. The applicant's calculations are incorrect and will not be considered further.

WIND SPEED AND TEMPERATURE STATISTICS

Staff has a number of meteorological file options from the San Francisco Bay Area, including BAAQMD website data and available data from SFO and San Jose. As the wind speed and temperature statistics are of greatest concern, the nearest BAAQMD monitoring station, Union City, can be used. The Union City monitoring station is located a little less than four miles southeast of the project site. **Plume Velocity Table 3** provides wind speed and temperature statistics for Union City as averaged over 7 years of available data.

PLUME VELOCITY Table 3
Wind Speed and Temperature Statistics for Union City

Wind Speed		Temperature		Temperature and Wind Speed	
≤ 1 m/s	8.29%	< 40F	2.60%	≤ 1 m/s, < 40F	0.70%
≤ 2 m/s	37.99%	< 50F	16.82%	≤ 1 m/s, < 50F	3.49%
≤ 3 m/s	59.83%	< 60F	60.12%	≤ 1 m/s, < 60F	6.94%
≤ 4 m/s	74.09%				
≤ 5 m/s	92.72%				

Source: Staff data reduction of Union City meteorological data (BAAQMD 2007).

Calm conditions/ low wind speeds are not frequent in the site area, but they do occur and occurrences during lower temperature conditions are more favorable to higher velocity conditions for the thermally buoyant gas turbine/HRSG and cooling tower plumes.

CONCLUSIONS

The calculated calm wind condition vertical plume velocities from the Eastshore engines and radiators are predicted to be less than 4.3 m/s at 500 feet above ground. However, the worst-case peak plume centerline velocities will exceed 4.3 m/s well into and perhaps above the pattern height for the Hayward Airport. The worst-case ambient conditions used in the velocity calculations will occur occasionally during the plant's life

when small aircraft could fly over the Eastshore stacks. Low wind speed conditions (less than 1 m/s hourly average) would occur more than eight percent of the time.

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HIGHWAY CAPACITY MANUAL

The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the Highway Capacity Manual (HCM) have been published. The current edition was published in 2000. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems. Methods identified in the HCM were used during the analysis of potential traffic and transportation impacts for the proposed Eastshore project.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the Highway Capacity Manual 2000. The Highway Capacity Manual 2000 represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A**.

Interrupted Flow

One of the more important elements limiting, and often interrupting, the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation, such as traffic signals, stop, and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting

traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Table A
Level of Service Description

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-way Stop Control - All-way Stop Control
Level of Service		
A	Free-flow	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow	Tolerable delay
E	Unstable flow	Limit of acceptable delay
F	Forced or breakdown flow	Unacceptable delay

Source: Highway Capacity Manual 2000

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the Highway Capacity Manual. It represents a departure from previous updates. In the third edition of the Highway Capacity Manual, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: Highway Capacity Manual 2000

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the Highway Capacity Manual and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The

approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

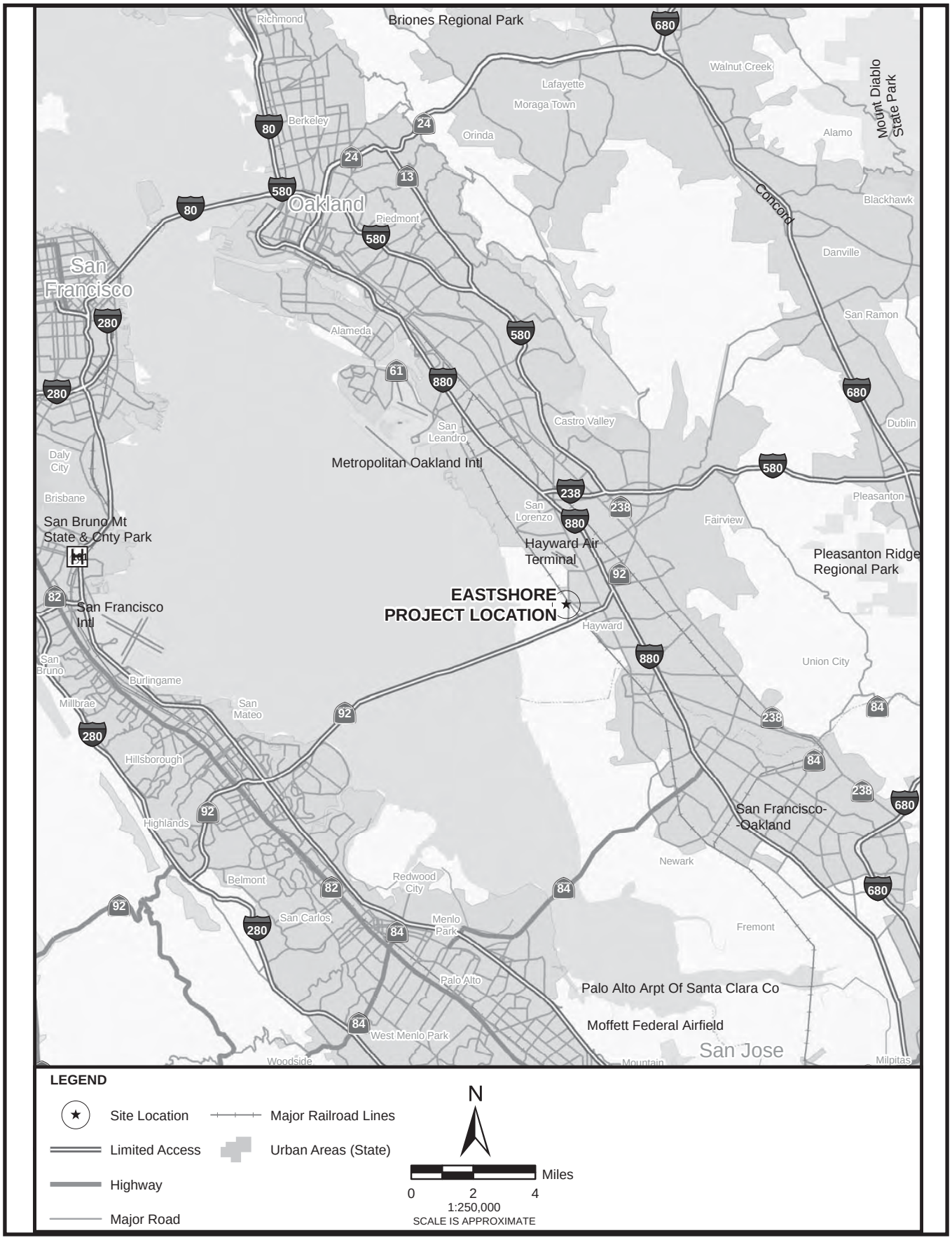
Source: Highway Capacity Manual 2000

REFERENCE

TRB 2000. Transportation Research Board, Highway Capacity Manual 2000; Washington, D.C.

TRAFFIC AND TRANSPORTATION - FIGURE 1

Eastshore Energy Center - Regional Transportation Facilities

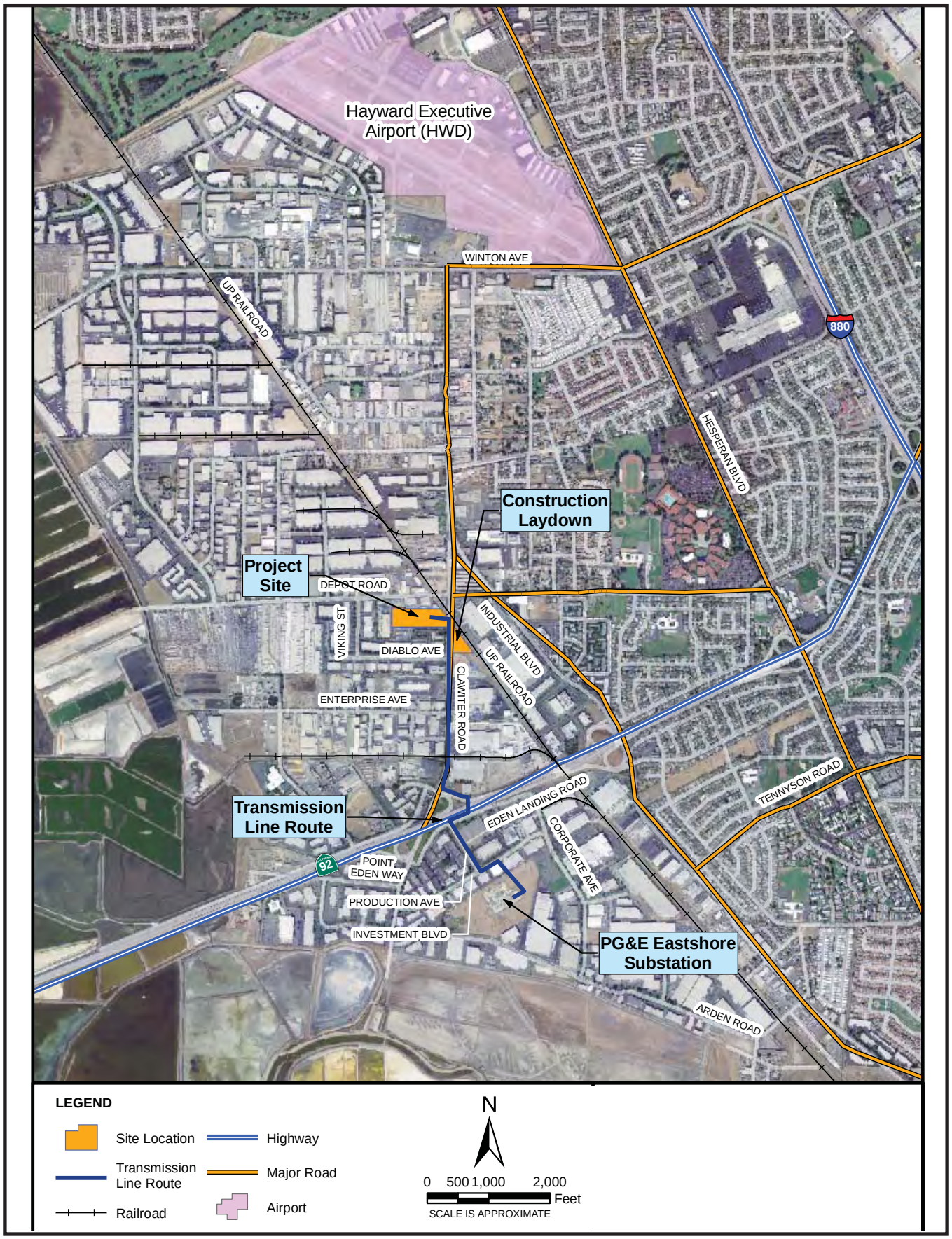


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 8.10-1

TRAFFIC AND TRANSPORTATION - FIGURE 2

Eastshore Energy Center - Local Transportation Facilities

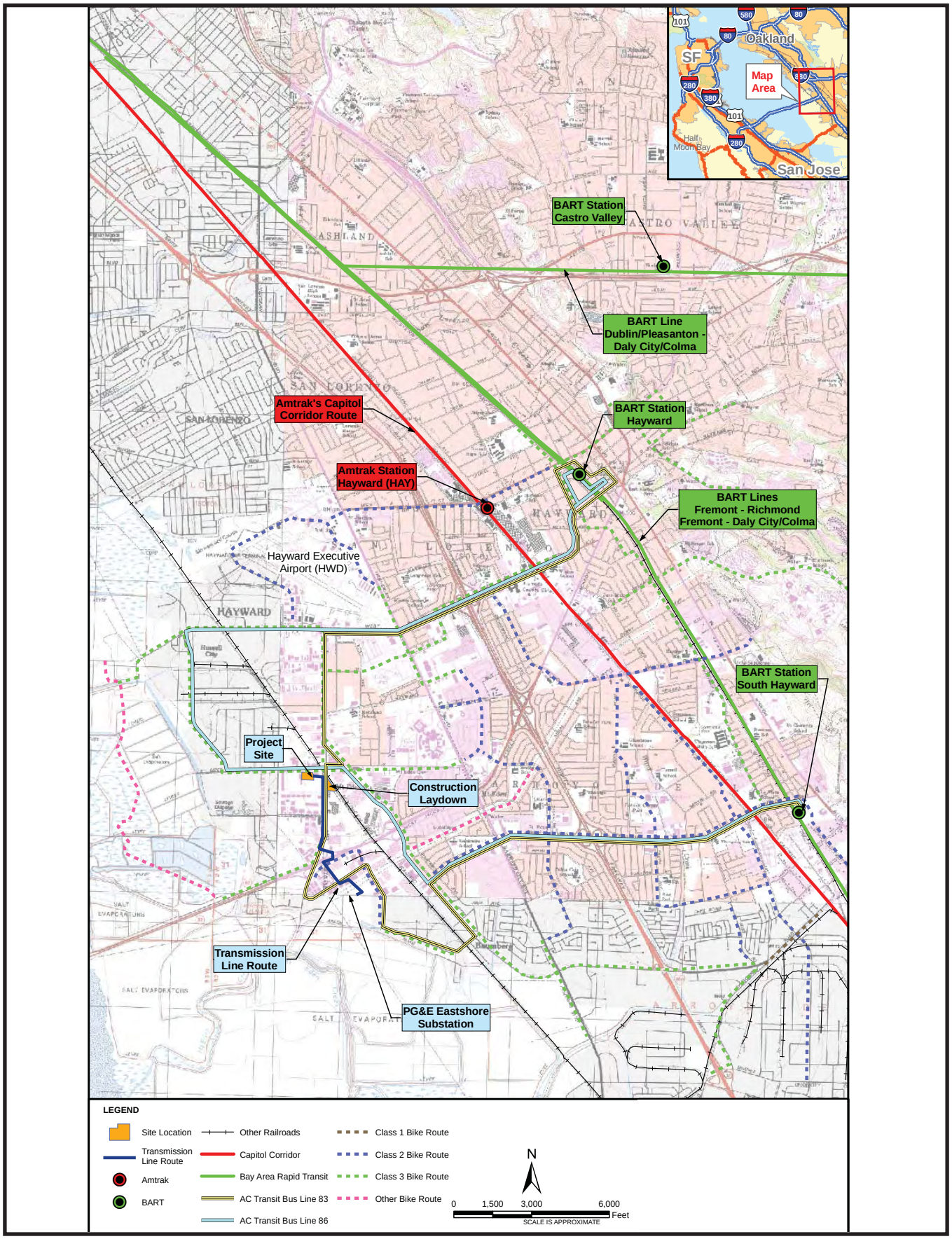


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 8.10-2

TRAFFIC AND TRANSPORTATION - FIGURE 3

Eastshore Energy Center - Public Transportation and Bicycle Facilities



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 8.10-5

TRAFFIC AND TRANSPORTATION - FIGURE 4A

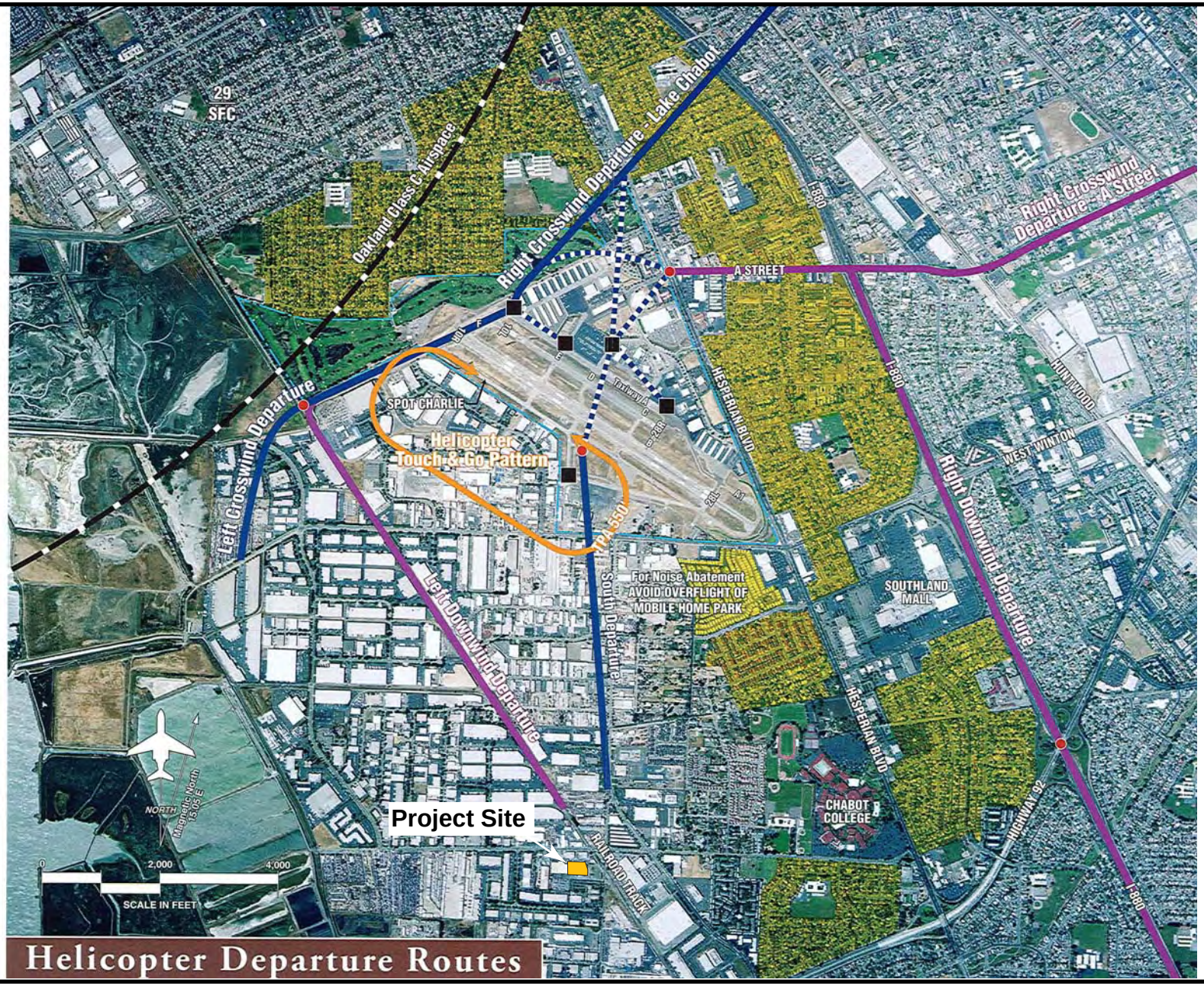
Eastshore Energy Center - Hayward Executive Airport Noise Abatement Procedures

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Noise Abatement Procedure Maps; City of Hayward Public Works Department; as of August 8, 2007

TRAFFIC AND TRANSPORTATION - FIGURE 4B

Eastshore Energy Center - Hayward Executive Airport Noise Abatement Procedures

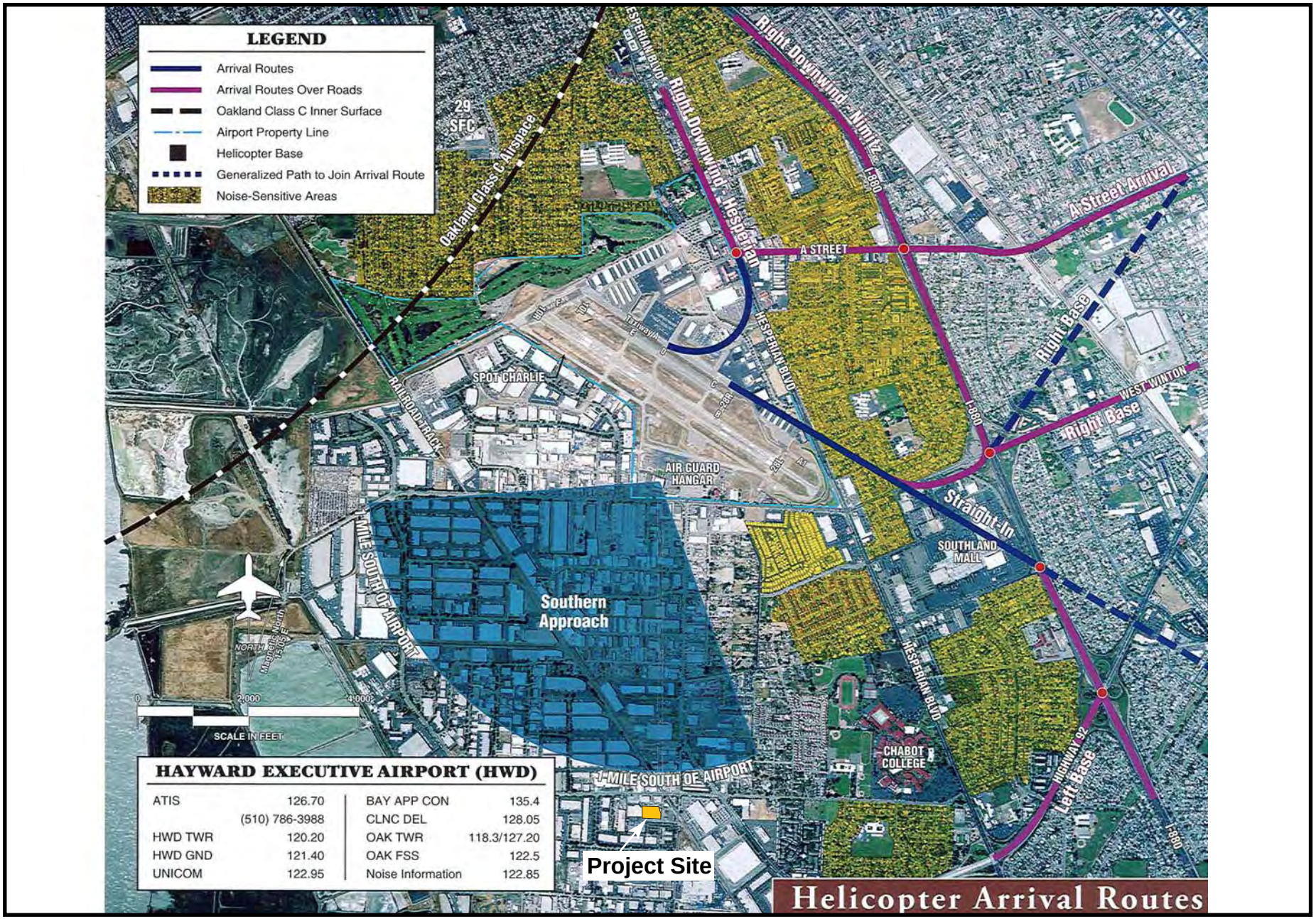


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Noise Abatement Procedure Maps; City of Hayward Public Works Department; as of August 8, 2007

TRAFFIC AND TRANSPORTATION - FIGURE 4C

Eastshore Energy Center - Hayward Executive Airport Noise Abatement Procedures



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Noise Abatement Procedure Maps; City of Hayward Public Works Department; as of August 8, 2007

TRAFFIC AND TRANSPORTATION - FIGURE 5

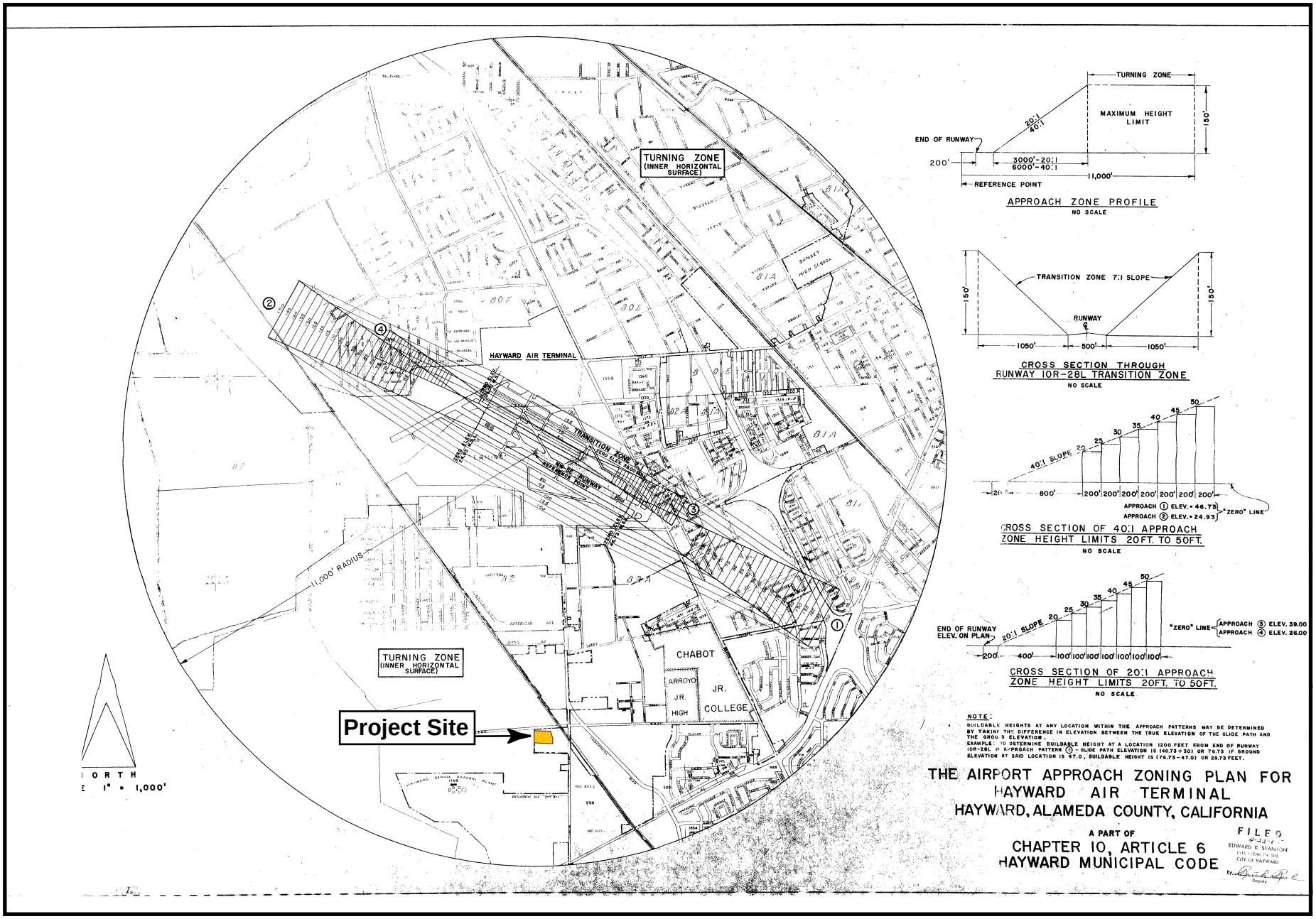
Eastshore Energy Center - Hayward Executive Airport Traffic Pattern Zone

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Hayward Executive Airport Master Plan - Final Technical Report (HWD 2002), prepared by Coffman Associates, Inc., Airport Consultants, in association with Environmental Science Associates (ESA); April 2002; Exhibit 5B, California Land Use Safety Zones

TRAFFIC AND TRANSPORTATION - FIGURE 6

Eastshore Energy Center - Hayward Executive Airport Approach Zoning Plan (AAZP) Map

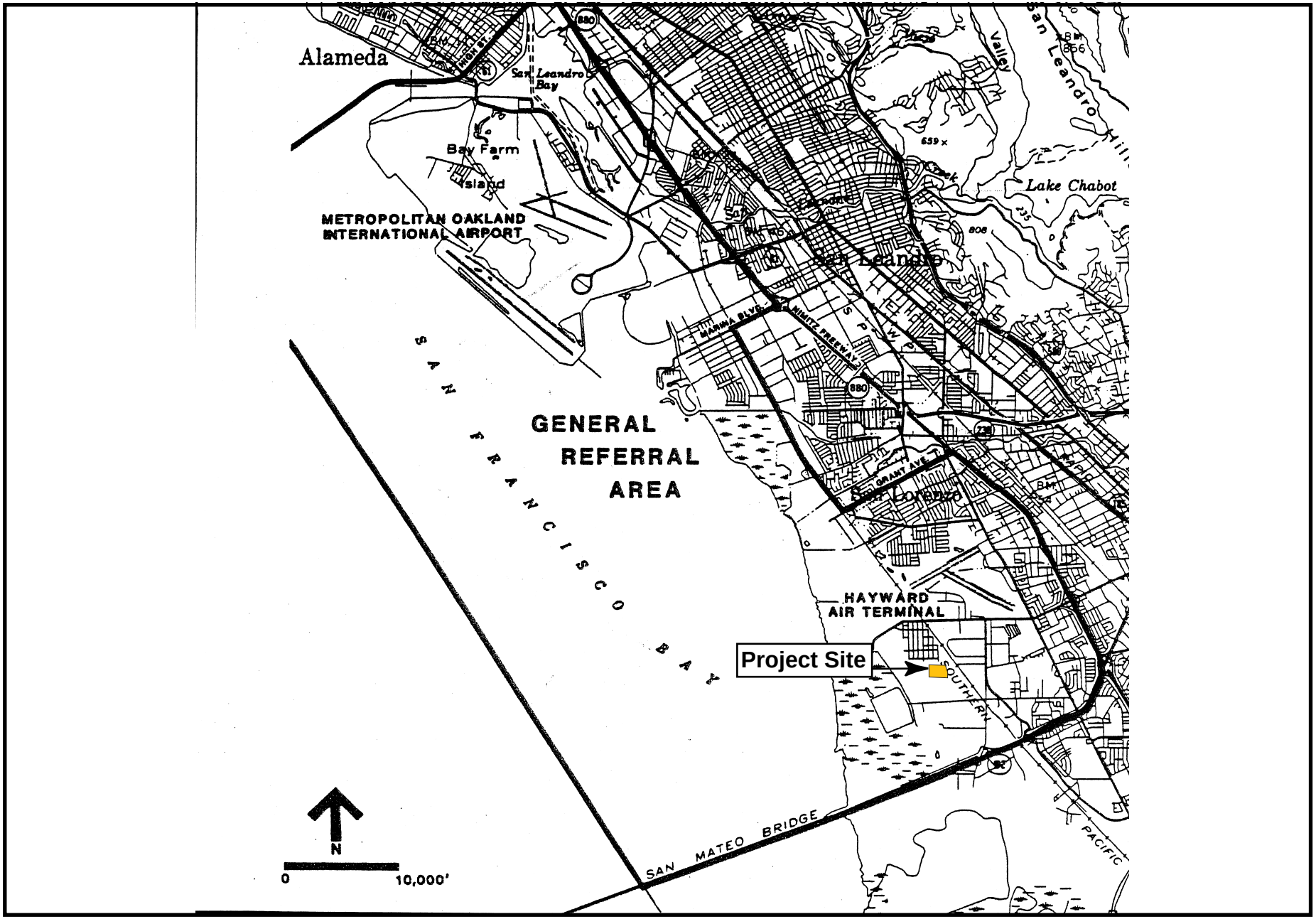


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: City of Hayward Airport Approach Zoning Regulations, Municipal Code Sections 10-6.20; Hayward City Council; adopted on September 15, 1964

TRAFFIC AND TRANSPORTATION - FIGURE 7

Eastshore Energy Center - Hayward Executive Airport Hazard Prevention Zone/General Referral Boundary (aka Airport Influence Area)



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Alameda County Airport Land Use Policy Plan (ACALUC 1986); Alameda County Airport Land Use Policy Plan, adopted by the Alameda County Airport Land Use Commission on July 16, 1986

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

Eastshore Energy, LLC (applicant), proposes to transmit power from the proposed Eastshore Energy Center (Eastshore) to PG&E's electric transmission grid through a new overhead 115-kilovolt (kV) transmission line which will connect the project to PG&E's Eastshore Substation, 1.1 miles to the south. The proposed line would traverse an industrial area with no nearby residences, thereby eliminating the potential for residential electric and magnetic field exposure which in recent years has raised human health concerns. PG&E will design, build, operate, and maintain the proposed line according to standard PG&E practices, which would conform to all applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any line-related safety and nuisance impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the project's proposed line design and operational plan to determine whether its related field and non-field impacts would constitute a significant environmental hazard in the area around the proposed transmission route. All related health and safety LORS currently are designed to minimize such hazards. Staff's analysis focuses on the following which relate to both the physical presence of the line and to the physical interactions of the line's electric and magnetic fields:

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

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

TRANSMISSION LINE SAFETY AND NUISANCE TABLE 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations, Objects Affecting the Navigable Air Space	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) notice of proposed construction or alteration in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space	Addresses the need to file a notice of proposed construction or alteration" (Form 7640) with the FAA in cases where the potential for an obstruction hazard exists.
FAA Advisory Circular 70/460-1G, Obstruction Marking and Lighting	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard, using criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines in order to prevent or mitigate interference.
Audible Noise	Not to exceed applicable local noise ordinances – there are no design-specific federal or state regulations for noise from transmission lines.
Hazardous and Nuisance Shocks	
State	
CPUC General Order 95 (GO-95), Rules for Overhead Electric Line Construction	Governs clearance requirements to prevent hazardous shocks and grounding techniques to minimize nuisance shocks, as well as requirements for maintenance and inspection.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. High Voltage Safety Orders	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, IEEE Guide for Fence Safety Clearances in Electric-Supply Stations	Specifies the guidelines for grounding-related practices within rights-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California	Specifies the application and noticing requirements for new line construction, including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency EMF.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring EMF from an operating electric line.
Fire Hazards	
State	
14 CCR Sections 1250-1258, Fire Prevention Standards for Electric Utilities	Provides specific exemptions from electric pole and tower fire breaks and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the site for the proposed Eastshore project is a 6.22-acre parcel in an industrial site currently occupied by a large industrial building which would be demolished before construction. The project's overhead transmission lines would be supported by new 115-kV transmission wood or steel poles in the existing corridor of PG&E's 12-kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115-kV transmission lines, the 85-foot pole structures would support the 115-kV transmission lines with under-built 12-kV distribution lines and a 90-foot pole structure would be placed on the south side and a 60-foot pole structure would be placed on the north side of Highway 92.

The project's overhead transmission line would traverse an industrial/commercial area with no nearby residences as it extends 1.1 miles south to its connection point at PG&E's Eastshore Substation. This absence of residences means that there would not be the long-term EMF exposure that is primarily responsible for the human health concerns. The only project-related EMF exposure of potential significance is the short-term exposure of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the immediate vicinity of the line. These types of exposures are short-term, well understood, and not considered to be of significant health concern. The proposed line's route is in an area with other PG&E transmission and distribution lines and its location was specifically chosen, in accordance with current state policy, to share an existing PG&E line corridor.

PROJECT DESCRIPTION

The proposed Eastshore transmission line will consist of the segments listed below:

- an overhead, single-circuit, 115-kV line extending approximately 1.1 miles south from the project site to the connection point at PG&E's Eastshore Substation; and
- the project's on-site 115-kV switchyard, from which the conductors would originate.

As more fully discussed by the applicant in EEC 2006a, pp 5-1 through 5-5, the proposed line's conductors would be standard low-corona aluminum steel-reinforced cables, to be erected on steel poles with a maximum height of 90 feet. When running within the corridor of the existing 12-kV distribution line, the Eastshore line could be located either on support structures by itself or share these structures with the 12-kV line, thus necessitating the removal of some existing wooden pole supports. The shared right-of-way would be widened according to PG&E requirements. The applied design and construction would also be performed according to PG&E's guidelines, which are necessary to ensure line safety and efficiency as well as reliability and maintainability.

The Eastshore line would exit the northeast corner of the project site from a 35-foot on-site structure and extend east for 150 feet to its first off-site pole support on the east side of Clawiter Road. From this structure, the line would extend south within the corridor of the 12-kV line on the way to its connection point at PG&E's Eastshore Substation. The applicant provided the details of the physical dimensions of the support structures as they relate to safety and field strength reduction.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends upon compliance with the listed LORS and their mitigation measures, which have been established to reduce impacts to levels below potential significance. Thus, if staff determines that the project would comply with applicable LORS, staff would then conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below, together with the potential for compliance with all applicable LORS.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the project's navigable airspace.

As noted by the applicant (EEC 2006a, p. 5-17), the maximum height of the proposed line support towers would, at 90 feet, be much less than the 200 feet considered by the FAA as triggering concerns over aviation safety. Furthermore, the line would be in an area with several other PG&E lines, some of which are of similar voltages and structural dimensions. The nearest public airport is the Hayward Executive Airport 1.5 miles to the north. While this distance is within the limits the FAA regards to be potentially hazardous to aircraft, the orientation and flight approach to its runway (in a north-to-northeast orientation) would place the proposed line away from the area posing a potential collision hazard. Given these conditions, staff considers the proposed line structures to not create an obstruction-related aviation hazard to area aircraft, as defined using the FAA's current criteria. Therefore, no FAA notice of construction or alteration would be required for the line.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of line electric fields. Such interference is due to radio noise produced by the action of the electric fields upon the surface of the energized conductor. This process is known as corona discharge, but is referred to as spark gap electric discharge when occurring within the gaps between the conductor and insulators or metal fittings. When generated, this noise manifests itself as either perceivable interference with radio or television signal reception, or interference with other forms of radio communication. Since the level of interference depends upon factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of this interference usually depends upon the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is, therefore, minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained in accordance with PG&E practices, which minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for transmission lines rated 345 kV and above, not for the proposed 115-kV line. The proposed low-corona designs are used for all PG&E lines of similar voltage to reduce surface-field strengths and the related potential for corona effects. Since these existing lines do not currently cause corona-related complaints along their existing routes, staff does not expect any corona-related radio-frequency interference or related complaints in the general project area. However, staff recommends Condition of Certification **TLSN-2** to ensure mitigation, as required by the FCC in the unlikely event of complaints.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by either federal or state regulations for specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance practices as established by industry research and experience to be effective without significantly impacting line safety, efficiency, maintainability, or reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor, and could be perceived as a crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends upon the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. This noise is usually generated during rainfall, mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as is proposed for the Eastshore project. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **Noise and Vibration** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** could be caused by sparks from conductors on overhead lines, or could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar PG&E lines would be implemented for the proposed project line (EEC 2006a, pp. 5-17 and 5-18).The applicant's compliance with the clearance-related aspects of GO-95 is an important part of this mitigation approach. **TLSN-4** is recommended to ensure compliance with fire prevention measures.

Hazardous Shocks

Hazardous shocks could result from either direct or indirect contact between an individual and the energized line, whether that line is overhead or underground. These shocks could cause serious physiological harm or death and remain a driving force in the design and operation of high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is ensured within the industry through compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where a line might be accessible to the public.

The applicant's implementation of the GO-95-related measures against direct contact with the energized line (EEC 2006a, pp. 5-17 and 5-18) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects that are electrically charged by fields from the energized line. These electric charges are induced in different ways by the line's EMF.

There are no design-specific federal or state regulations that limit nuisance shocks in the transmission-line environment. For modern overhead high-voltage lines, shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC), the joint guidelines of the American National Standards Institute (ANSI), and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the operator will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way (EEC 2006a, p. 5-15). Staff recommends Condition of Certification **TLSN-5** to ensure that these grounding practices are followed.

Electric and Magnetic Field Exposure

The possibility of adverse health effects from EMF exposure has raised public concerns in recent years about living near high-voltage lines. Both electric and magnetic fields occur together wherever electricity flows and exposure to them together is generally referred to as EMF exposure. Available evidence, as evaluated by the CPUC, other regulatory agencies, and staff has not established that EMF poses a significant health hazard to humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify the retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that, while such a hazard has not been established from the available evidence, the same evidence does not serve as proof that a hazard does not exist. Staff, therefore, considers it appropriate, in light of this present uncertainty, to recommend the feasible reduction of EMF without affecting safety, efficiency, reliability, or maintainability.

While there is considerable uncertainty about the health effects of EMF, the following facts have been established from the available information and have been used to establish existing policies.

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending upon the type and extent of those measures.

State

In California, the CPUC, which regulates the design, installation and operation of most high-voltage lines, has determined that only no-cost or low-cost measures are presently justified in the effort to reduce EMF created by power lines beyond the levels that existed before current health concerns arose. The CPUC has further determined that reduced exposure should be made only in connection with either new or modified lines. It requires that each utility within its jurisdiction establish EMF-reducing measures and incorporate these measures into designs for both new or upgraded power lines and related facilities. The CPUC further established specific limits on the resources to be used in each case for field exposure reduction. The CPUC intended that these limitations apply to the cost of any redesign that reduces field strength or to relocations that reduce exposure. Publicly owned utilities, which do not fall within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires evidence that each proposed line is designed according to the EMF-reducing design guidelines applicable to the concerned utility service area. These field-reducing measures can impact line operation if applied without adequate regard for environmental and other local factors that bear on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that these measures are applied in ways that prevent significant impacts to line operation and safety. The extent of such applications would be reflected by ground-level field strengths, as measured during project operation. When estimated or measured for lines of similar voltage and current-carrying capacity, these field strength values can be used by staff and other regulatory agencies to assess the effectiveness of applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above ground, in kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, the degree of cancellation from nearby conductors, the distance between conductors and, in the case of magnetic fields, the amount of current on the line.

Since most new or modified lines in California are designed according to CPUC-approved EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Since PG&E is the utility in this case, designing the proposed project line according to existing PG&E safety and field strength-reducing guidelines would constitute compliance with the CPUC's requirements for safety and field management.

The CPUC recently finished revisiting the EMF management issue to assess the need for policy changes that reflect available information on possible health impacts. The findings (Decision 06-08-019 of August 24, 2006) did not identify a need for significant changes to existing field management policies.

Industrial Standards and Related Field Exposures

There are no specific industry limits on fields from power lines and other EMF sources. The existing industry design guidelines are intended to limit field exposures within levels possible without specific impacts on efficiency, maintainability, safety, and reliability of the source. The present regulatory focus on magnetic fields exists because only they can penetrate soil, buildings, and other materials to potentially produce health effects in building occupants. Although there is continuing focus on the strong magnetic fields from highly visible overhead transmission and other power lines, it is important for perspective, to note that an individual at home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1995). The difference between those field exposures and those of the higher-level, appliance-related exposures is one of duration and intensity. The latter is short-term, while exposure from power lines is lower level, but long-term. Scientists have not established which of these exposures would be more biologically meaningful in an individual. Staff notes these exposure differences only to show that high-level magnetic field exposures occur regularly in many areas other than around high-voltage transmission lines.

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the design of the proposed line to ensure the field strength minimization required by the CPUC.

The field reduction measures to be applied include:

1. Increasing the distance between the conductors and the ground;
2. Reducing the spacing between the conductors;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from the interaction of conductor fields.

Since optimum field-reducing measures would be incorporated into the proposed line design, staff considers further mitigation to be unnecessary, but would seek to validate the applicant's assumed reduction efficiency from the field strength measurements recommended in Condition of Certification **TLSN-3**.

CUMULATIVE IMPACTS AND MITIGATION

Since the proposed project transmission line and switchyard would be designed according to applicable field-reducing PG&E guidelines (as required by the CPUC for effective field management), staff expects the resulting fields to be of the same intensity as fields from PG&E lines of the same voltage and current-carrying capacity. Any contribution to cumulative area exposures should be at similar levels. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management.

The applicant (EEC 2006a, pages 5-8 through 5-12 and 5-29 through 5-32) calculated the electric and magnetic field levels for (a) the section where the project line would run

parallel to the existing 12-kV line while on the same or separate support structures, and (b) where the project line would occupy a right-of-way by itself. The maximum calculated electric field strength in any of both segments is 0.26 kV/m within the shared right-of-way, or 0.6 kV/m in the 115 kV line's own right-of-way. The maximum magnetic field strength is 23 mG within the shared right-of-way and 19.5 mG within the line's own right-of-way. Such low electric and magnetic field intensities are similar to those from other PG&E lines. The 23 mG value for the magnetic field is much lower than the 150 mG to 200 mG established for transmission lines and related facilities by the few states with established regulatory EMF limits. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-3** as a way to verify the field reduction efficiency assumed by the applicant.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to meet the field strength-reducing guidelines of the area utility to which the line will be interconnected. The utility in this case is PG&E. Since the proposed project line and related switchyard would be designed by PG&E according to its respective requirements of GO-95, GO-52, GO-131-D, and Title 8, California Code of Regulations Section 2700 et seq., and operated and maintained according to current PG&E guidelines on line safety and field strength management, the presented design and operational plan will be in compliance with the health and safety LORS of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

CONCLUSIONS

Since the proposed project line would not run in a direction that could pose an aviation hazard for the nearest airport, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in accordance with current PG&E guidelines, which reflect standard industry practices. These field-reducing measures would maintain the generated fields within levels not associated with either radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements specified in CPUC General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, will minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication around the proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed PG&E and similar transmission lines, the public health significance of any related field exposures cannot be assessed with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to the extent the CPUC considers appropriate in light of current available health information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the general absence of residences in the immediate vicinity of the proposed route. On-site worker or public exposure would be short-term and at levels expected for PG&E lines of similar design and current-carrying capacity. Such exposure is well understood and has not been determined to cause a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff, while located along a route without nearby residences, the proposed design, maintenance, and construction plan will be in compliance with applicable laws. With the conditions of certification proposed below, any impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission lines according to the requirements of CPUC GO-95, GO-52, GO-131-D, Title 8, and Group 2. High voltage electrical safety orders, sections 2700 through 2974 of the California Code of Regulations, and PG&E's EMF-reduction guidelines.

Verification: At least 30 (or fewer, as mutually agreed between the project owner and the compliance project manager) days before beginning construction of the transmission line or its related structures and facilities, the project owner shall submit to the compliance project manager a letter signed by a California-registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from the operation of project-related lines and associated switchyards. The project owner shall maintain written records, for a period of five years, of all complaints of radio or television interference attributable to plant operation, together with the corrective action(s) taken to address each complaint. All complaints shall be recorded to include notations of corrective actions taken. Complaints not resulting in a specific action, or for which there was no resolution, should be both noted and explained. The record shall be signed by both the project owner and the complainant, if possible, to indicate concurrence with the corrective action or agreement with the justification for a lack of action.

Verification: All reports of line-related complaints shall be summarized for project-related lines and included, during the first five years of plant operation, in the annual compliance report.

TLSN-3 The project owner shall hire a qualified consultant to measure the strength of EMF~~s~~ both before and after the line is energized. The measurements shall be made according to American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures at the locations of maximum field strengths along the proposed route. These measurements shall be completed no later than six months after the beginning of operations.

Verification: The project owner shall file copies of the pre- and post-energization measurements with the CPM within 60 (or fewer, as mutually agreed between the project owner and the compliance project manager) days after completion of those measurements.

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

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results along with all fire prevention activities carried out along the right-of-way, and provide those summaries in the annual compliance report.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards, regardless of ownership. In the event of a refusal by any property owner to permit this grounding, the project owner shall notify the CPM. This notification shall include, when possible, the owner's written objection. Upon receipt of this notice, the CPM may waive the requirement for grounding the object involved.

Verification: At least 30 (or fewer, as mutually agreed between the project owner and the compliance project manager) days before the lines are energized, the project owner shall transmit, to the CPM, a letter confirming compliance with this condition.

REFERENCES

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and above.

Eastshore Energy Center 2006a. Application for Certification. Volumes I and II. Submitted to the Energy Commission on September 22, 2006.

National Institute of Environmental Health Services 1998. *An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*. A working group report, August 1998.

VISUAL RESOURCES

Testimony of Mark R. Hamblin

SUMMARY OF CONCLUSIONS

Staff has analyzed visual resource related information pertaining to the proposed Eastshore Energy Center (Eastshore) project, and found that the project would not introduce an adverse "Aesthetic" impact under the California Environmental Quality Act (CEQA) and Guidelines, and would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics, or preservation and protection of sensitive visual resources.

INTRODUCTION

Visual resources are the viewable natural and man-made features of the environment. In this section, staff evaluates the proposed project's construction and operation using the "Aesthetic" section in the CEQA Guidelines to determine if the project would introduce a significant impact under CEQA, and if the project would comply with applicable state and local LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources relevant to the proposed project.

VISUAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	The project site does not involve federal managed lands, a recognized National Scenic Byway or All-American Road, or a designated State Scenic Highway.
State	
Local	Promotes infill development that is compatible with the overall character of the surrounding neighborhood. Encourages visual integration of projects of differing types or densities through the use of building setbacks, landscaped buffers, or other design features. Ensures that design reflects concerns about the preservation of viewsheds.
City of Hayward General Plan, Land Use Policies And Strategies – Infill Development	
City of Hayward Municipal Code Section 10-1.600 et seq.	Provides site plan review requirements, and establishes performance standards for development projects; including architectural design, landscaping, exterior lighting and outdoor storage. Ensures that the architectural design of structures and their materials and colors are visually harmonious with surrounding development and natural land forms.

SETTING

The proposed Eastshore Energy Center project would be built in the city of Hayward in Alameda County, California. The city is nestled between San Francisco Bay and the East Bay Hills. Mt. Diablo (elevation 3,849 feet) is to the northeast of the city. Hayward has a central bay shoreline, a historic city center, and a hub of highways that connects the bay area to the inland areas of California. According to the city of Hayward's official website, the city is 62.5 square miles and has an approximate population of 147,000 (2006) (see **Visual Resources Figure 1** – Aerial View of Site and Laydown Area).

The proposed power plant would be constructed on an approximate 6-acre parcel in an area designated by the city as the "Industrial Corridor" and zoned "Industrial." The Industrial Corridor involves a 3,500 acre area in western and southern Hayward (see **Visual Resources Figure 2** – City of Hayward Industrial Corridor). For over 40 years, the Industrial Corridor attracted warehouse and distribution facilities. More recently, the Industrial Corridor has attracted high-tech and research and development related firms. Approximately 2,500 acres are currently devoted to industrial uses. Another 600 acres are presently devoted to commercial, residential, or public and quasi-public uses (COH 2002a, pg. 2-12-13). The project site is surrounded by various commercial/industrial operations.

PROJECT

On the project site is a vacant 100,000 square foot (approximate), 25-foot tall horizontal block building most recently used to conduct metal finishing. The building was vacated in 2005. The building is to be demolished if the Eastshore project is granted a license by the California Energy Commission.

The proposed Eastshore project would be built on a 6-acre site (project site). The project's most publicly visible structures would include: fourteen 70-foot tall, 4-foot diameter exhaust stacks, and the 36-foot tall by 417-foot long by 71-foot wide Power House "A" building (see **Visual Resources Figure 3** – Plant Elevation Looking North, and **Visual Resources Figure 4** – Plant Elevation Looking West).

The Eastshore project would connect to PG&E's Eastshore Substation by a new approximate 1.2-mile long generator tie line (transmission line). The 1.2-mile transmission line would be supported by new 115-kV transmission wood or steel poles in the existing corridor of PG&E's 12-kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115-kV transmission lines, the 85-foot pole structures would support the 115-kV transmission lines with underbuilt 12-kV distribution lines to accommodate the existing PG&E transmission lines along Clawiter Road, and a 90-foot pole structure would be placed on the south side and 60-foot pole structure on the north side of Highway 92.

Potable water would be provided to the Eastshore project by a short underground connection to an existing city water main located under Clawiter Road. Sanitary sewer service would be provided by connection to a city sanitary sewer line also located under Clawiter Road.

Natural gas would be supplied to the site by means of a new 200-foot long (approximate) underground pipeline connecting to gas line 153 that runs along the opposite side of Clawiter Road. Line 153 is owned by PG&E.

The construction laydown and parking area for the Eastshore project would be located on a 4.65 acre portion of the Berkeley Farms dairy processing facility property across Clawiter Road from the project site. The site currently has piles of concrete and wood debris and mounds of gravel and soil on its north end. On the south end, tractor trailers associated with the Berkeley Farms operation are parked. During the Eastshore project construction period, the laydown area would be used for vehicle parking and the storage of equipment and materials.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2006 CEQA Guidelines Appendix G Environmental Checklist pertaining to “Aesthetics.” The checklist questions include the following:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a “Key Observation Point” [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[1] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select KOPs that would most clearly display the visual effects of the proposed project. KOPs may also represent primary viewer groups that would potentially be affected by the project. In addition to the KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area.

[1]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

Staff also reviews federal, state, and local LORS and their policies or guidelines for aesthetics, or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance).

Please refer to **APPENDIX VR-1** for a complete description of staff's visual resources evaluation process. **APPENDIX VR-2** provides terms defined by staff for the purpose of this analysis.

Visual Resources Figure 5 shows the locations of the five KOPs used in this analysis:

- KOP 1 – Junction of Gettysburg Avenue and Bradford Avenue;
- KOP 2 – West Entrance of Life Chiropractic College West (identified as Viewpoint A on supplemental information docketed on May 4, 2007);
- KOP 3 – Clawiter Road north of railroad track crossing (identified as Viewpoint B);
- KOP 4 – Depot Road east of the intersection with Industrial Boulevard (identified as Viewpoint C); and
- KOP 5 – Depot Road at Monte Vista Drive (identified as Viewpoint D).

Staff's analysis of the project's effect on each KOP is presented under **Operation Impacts**. Photographs and simulations from the Hayward Shoreline Interpretive Center identified as KOP 6 (Viewpoint E), and State Route 92 at Hayward-San Mateo Bridge Toll Plaza identified as KOP 7 (Viewpoint F) have not been included in the KOP analysis. The publicly visible structures on the project site would be unnoticed from these two KOP locations.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics: scenic vista, scenic resources, visual character or quality and light or glare.

A. SCENIC VISTA

CEQA checklist question: "Would the project have a substantial adverse effect on a scenic vista?"

A scenic vista for the purpose of this analysis is defined as a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality. There are no scenic vistas in the KOP 1, KOP 2, KOP 3, KOP 4 and KOP 5 viewsheds. The proposed project would not cause a significant visual impact to a scenic vista.

B. SCENIC RESOURCES

CEQA checklist question: "Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree

having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

Mount Diablo (elevation 3,849) is located approximately 20 miles northeast of the city of Hayward. Mount Diablo is listed number 905 on the California Historical Landmarks and listed NPS-76000526 on the National Register of Historic Places. It is not within the viewsheds of KOPs 1 through 5.

The Hayward Regional Shoreline, approximately one mile west of the project site, is a unique water feature that consists of 1,682 acres that includes salt, fresh, and brackish water marshes, seasonal wetlands and approximately three miles of the San Lorenzo Trail. The Oliver Salt Ponds within the Hayward Regional Shoreline have been placed on the National Register of Historic Places and is designated a "Rural Historic Landscape[2]." The salt ponds are maintained as habitat for the Western Snowy Plover, a species listed by the federal government in 1993 as threatened (see **Visual Resources Figure 6** – Landscape Character Photo - Hayward Regional Shoreline Looking Northeast from the Hayward Interpretive Center). The Hayward Regional Shoreline is not visible within the KOP 1-5 viewsheds.

In the KOP 1, KOP 2, KOP 3, KOP 4 and KOP 5 viewsheds there are no identified scenic resources. The proposed project would not cause a significant visual impact to a scenic resource.

C. VISUAL CHARACTER OR QUALITY

CEQA checklist question: "Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

Construction Impacts

The Eastshore project includes the demolition and removal of the 100,000 square foot warehouse, foundations and existing paved surfaces on the project site to allow its construction. As a part of the overall site demolition, removal of the existing buildings will leave approximately 16,730 cubic yards of select material above the adjacent existing finished grade which may potentially be visible to the public, specifically motorists. The project is to use this soil onsite for the new perimeter access road and to raise the center portion of the proposed main plant area. In addition, the east end of the site will also be raised to be compatible with the existing finished elevations on Clawiter Road (EEC 2007a, pg. 2-16). A preliminary site grading, drainage and erosion control plan is presented in section 8.14 (Water Resources) of the AFC.

Construction activities for the project would occur during an approximate 18-month period. Main activities that would be ongoing on the power plant site during the

[2] This distinction applies to lands that were used by people in the pursuit of day-to-day activities and were shaped or modified by their users in response to the forces of nature. In the case of the Oliver Salt Ponds, the flat, windswept salt marshes and their accompanying clay soils were the perfect landscape to manipulate for the ponding of acres of bay water (Hayward Regional Shoreline Interpretive Center).

construction period include: the installation of the combustion turbine generators (CTGs) and power train foundations, erecting of the CTGs, the installing of pipe supports, liner plates and baffles and aboveground electrical, exhaust stack fabrication and condenser work, the installing of aboveground tanks and prefabricated buildings.

During the construction period, materials, heavy equipment and parked vehicles on the 6-acre laydown area would potentially be publicly visible to motorists consisting mainly of workers and patrons of commercial and industrial operations within the Industrial Corridor (see **Visual Resources Figure 7** – Landscape Character Photo of Construction Laydown Area Looking South). The applicant states "During the construction period, the boundaries of the project site and laydown areas that border public streets will be screened using chain-link fencing covered with a screening fabric or Privamax" (EEC 2006a, pg. 8.11-15). The ground level visual exposure would be limited by the fence level screening; as project structures are erected that exceed the height of the fence they would become exposed. There is not an unobstructed view of the laydown area or project site from a KOP. Therefore temporary construction impacts would be less than significant. A potential viewer from the Life Chiropractic College West would have an obstructed view of the construction laydown area and the project site due to a line of bushes along the edge of its property (see **Visual Resources Figure 8** – Landscape Character Photo – Proposed Construction Laydown Location Looking Toward Life Chiropractic College West).

Typically screening of onsite construction site activities is accomplished by attaching a fabric or adding wooden slats to a perimeter fence. This screening is effective in limiting ground level visual exposure of the construction site and laydown area. Staff believes that the applicant's effective implementation of the proposed mitigations involving the fence screening and the described lighting would help to make the project site and laydown area visually less distracting to motorists and neighboring commercial/industrial operations during the construction period.

Project construction activities would take place the majority of the time during daylight hours. Lighting that may be required to facilitate nighttime construction activities would, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting will be used to the extent practical while complying with worker safety regulations. There may be certain times when the project site may temporarily appear as a brightly lit area, when seen in views from nearby locations, but these potential impacts would be temporary (EEC 2006a, pg. 8.11-14) to the KOP viewshed. Thus the impact of construction activity-related lighting would be less than significant. The applicant's proposed use of shielded directional exterior lights and low-pressure sodium lamps and fixtures of a non-glare type in the construction laydown area would minimize offsite light and glare impacts introduced by construction activities on the project site and laydown area.

The ground surface along the proposed alignments would be temporarily disrupted by the presence of construction equipment, excavated piles of soil, concrete and pavement, and construction personnel and vehicles. The applicant states "site and project linears will be constructed in currently developed areas that will be repaved or otherwise protected after construction" (EEC 2006a, pg. 8.9-14). With the burying of

pipelines and the restoration of the ground surface the construction of the linears would not create a change to the existing visual condition. Staff has recommended condition of certification **VIS-1** to provide for the restoration of ground surfaces affected by construction activities to ensure that these construction activities are temporary in nature and would not result in a long-term visual degradation.

Overall, staff believes the project's proposed construction activities with the effective implementation of mitigations proposed by the applicant and staff's proposed condition of certification **VIS-1** would generate a less than significant visual effect.

Operation Impacts

KOP 1 - Junction of Gettysburg Avenue and Bradford Avenue

Visual Resources Figure 9 represents the existing view toward the project site near the junction of Gettysburg and Bradford Avenues. The KOP 1 location is approximately 3,000 feet east of the project site. The KOP 1 location is from a medium to high density residential area comprised mainly of one-story single family residences.

The KOP 1 view includes single family residences with ornamental landscaping and overhead transmission and utility lines. A portion of the roof of a two-story apartment building interspersed in the line of trees behind the single family residences can be seen. The two-story apartment building is in a complex of approximately 24 buildings called the Waterford Apartments. The KOP 1 view is obstructed towards the proposed project site by the Waterford Apartment complex. The KOP 1 location is on the east side of the Waterford Apartments. Project structures would not be introduced into the KOP 1 viewshed. The preparation of a photo simulation at this location would not show power plant structures. The proposed project's structures would generate no visual effect at KOP 1.

Waterford Apartment Complex

Staff visited the west side of the Waterford Apartment complex and found that a ground level view towards the project site was obstructed by Heald College, Life Chiropractic College West and Mt. Eden Nursery Company (see **Visual Resources Figure 10** – Landscape Character Photo from Heald College Towards Project Site). **Visual Resources Figure 11** provides a view towards the project site from the second floor of apartment building "W" (apartment no. 2271) from the Waterford Apartment complex. Apartment no. 2271 is at the north end of the complex. The project site is approximately 2,100 feet to the west. Heald College is in the view to the left. From the second floor a small portion of the top of an exhaust stack on the project site potentially may be seen over the roof top of Life Chiropractic College West seen in the middle of the view in the background. Staff concludes the introduction of the Eastshore project structures to the existing viewshed at this location would not substantially degrade a ground level or second story view.

KOP 2 – Life Chiropractic College West, West Entrance

Visual Resources Figure 12 represents the existing view from the west entrance of the Life Chiropractic College West to the proposed project site which is approximately 375 feet away. **Visual Resources Figure 13** represents a bird's eye view of the existing site and vicinity.

Visual Sensitivity

The view from KOP 2 towards the project site includes an asphalt parking lot with trees planted in tree wells, landscape medians, interspersed with several vertical pole structures of various heights; some serve as light standards others as utility poles. A row of bushes line the rear edge of the parking lot, and a single railroad track is seen beyond it. The top portion of the former Trend Metal Finishing Facility on the project site is in the view. The estimated public appeal of the visual impression (quality) of the KOP 2 viewshed is considered to be moderately low.

Viewers at this KOP location would mainly consist of students and employees at the chiropractic college who would be exposed to a short duration view of the project site walking between the parking lot and the college building. The number of students that attend the chiropractic college is approximately 600. Not all students would drive a vehicle and not all students would be parking in the west entrance parking lot. The KOP 2 viewshed does not include a scenic resource or vista. There is no focal point in the viewshed that draws the viewer's eye to a unique feature (e.g., historic building). The estimated level of viewer concern towards preserving the existing KOP 2 viewshed is considered to be low.

The KOP 2 viewshed is obstructed towards the proposed project site from the college's west entrance. The view of the proposed project site is obstructed by natural elements – trees and bushes. The degree of visibility of the project site from the KOP is considered to be moderately high. The duration of view to an exposure of power plant structures from a viewer transitioning between the parking lot and the school would be considered low (brief). Overall, viewer exposure is considered moderately low.

The overall visual sensitivity for viewers would be considered moderately low from the KOP 2 location. This view assessment is the result of a moderately low visual quality, low viewer concern, and a moderately low overall viewer exposure.

Visual Change

Visual Resources Figure 14 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 2 viewshed. **Visual Resources Figure 15** represents a bird's eye view of a photo simulation of the completed project.

The contrast (includes form, line, color, and texture) introduced by the project's publicly visible structures would be seen and attract attention from this KOP. They would be visually unobstructed from KOP 2. The potential contrast of the structures is considered high.

The applicant states "The exteriors of all project buildings and major project equipment will be shades of off white, beige, tan, and gray to optimize the project facility's visual integration with the surrounding environment. The power plant site will be surrounded by an 8-foot-high, chain-link fence. All outdoor storage will be located or screened so as to not be visible from the public right-of-way. Landscape vegetation at the project site perimeter will be developed in consultation with the city of Hayward to meet the city's landscaping requirements" (EEC 2006a, pg. 8.11-12).

A conceptual landscape plan was provided by the applicant which shows the planting of redwood trees, Agapanthus-white, California lilac, Saucer magnolia, and a native wildflower mix along the project site's frontage on Clawiter Road (CH2MHill 2007d)(see **Visual Resources Figure 16** – Conceptual Landscape Plan, **Visual Resources Figure 17** – Landscape Plan Plant Palette).

The Figure 14 photo simulation shows that the proportionate size relationship of the visible project structures to other man-made and natural elements would occupy a small portion of the total field-of-view of KOP 2. In addition the structures would visually appear co-dominate when compared to other elements in the KOP view. The relative visual scale of the structures as simulated in the KOP 2 viewshed is considered to be moderate.

The degree of view disruption introduced by project structures is considered to be moderately low. The amount of the sky blocked currently by the existing warehouse is estimated to be similar to that which would be blocked by the proposed exhaust stacks, Power Block A, and onsite mature landscaping from this KOP location.

The overall visual change caused by the introduction of the proposed project's structures into the viewshed is considered to be moderate as a result of a high visual contrast, moderate visual scale, and moderately low view disruption.

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed at KOP 2. When considering the overall visual sensitivity of the viewing group at KOP 2 (chiropractic school viewer [moderately low]), and the moderate overall visual change, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

KOP 3 – Clawiter Road Near Railroad Track Crossing West

Visual Resources Figure 18 represents the existing view of the proposed project site from Clawiter Road approximately 375 feet south of the intersection with Depot Road.

Visual Sensitivity

The KOP 3 viewshed includes a portion of Clawiter Road, railroad track and the former Trend Metal Finishing Facility. The 100,000 square foot building is approximately 200 feet from the road. The estimated public appeal of the visual quality of the KOP 3 viewshed is considered to be moderately low.

Clawiter Road is not identified as a scenic highway, scenic drive, or landscaped drive by the city General Plan. Viewers at this KOP location appear to largely consist of motorists, who are workers and patrons to commercial/industrial operations in the Industrial Corridor, and students and employees attending Life Chiropractic College West. There is no identified or designated scenic resource or vista in the KOP view. There is no focal point in the viewshed that draws the viewer's eye to a unique feature. The estimated level of viewer concern towards preserving the existing KOP 3 viewshed is considered to be low.

The KOP 3 view towards the proposed project site is visually unobstructed, and its visibility is considered to be high from the KOP location. The AFC states that the

Average Daily Traffic (ADT) count of vehicle trips along the segment of Clawiter Road between Industrial Boulevard and the westbound ramp of State Route 92 is 18,600 (EEC 2006a, pg. 8.10-11). If at least one individual per vehicle trip was exposed to a view of the project site, the estimated number of motorist exposures would be considered high. Staff visited the project site and estimates the duration of view for motorists traveling north or south on Clawiter Road at the legal speed limit through the KOP 3 viewshed to a potential exposure of the power plant site to be 10 to 20 seconds. This duration of exposure is considered to be moderately low. Overall viewer exposure is considered moderately high.

The overall visual sensitivity for motorist would be considered moderate from the KOP 3 location. This visual assessment is the result of a moderately low visual quality, low viewer concern, and a moderately high overall viewer exposure.

Visual Change

VISUAL RESOURCES Figure 19 represents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 3 viewshed.

The contrast introduced by proposed project structures is considered to be noticeable from this KOP. The potential contrast of the structures is considered high (strong).

The photo simulation of project structures shows that their proportionate size relationship to other man-made and natural elements would be large in the total field-of-view of KOP 3. In addition, the structures would appear dominate when compared to other elements in the KOP view. The relative visual scale of the structures as simulated in the KOP 3 viewshed is considered to be high.

As previously noted, the amount of sky currently blocked by the warehouse is shown to be about the same as that which would be blocked from view by the proposed project structures from this KOP location.

The applicant has provided a conceptual landscape plan (see **Visual Resources Figure 16** – Conceptual Landscape Plan). The legend on the conceptual landscape plan shows the species proposed for planting, and the approximate heights of the species at planting, at five years of growth and 10 years of growth. The legend also provides container sizes of the proposed trees and plants to be planted. The city of Hayward's "Industrial District" requires street trees to be planted along street frontage at a minimum of one 25-inch box tree per 20 to 40 lineal feet of frontage or fraction thereof, except where space is restricted due to existing structure or site conditions (COH 1986, Section 10-1.1645 l. (4)). The applicant states in the AFC that the landscaping plan will conform to the city's landscaping requirements (EEC 2006a, pg. 8.11-25). The applicant has provided a photo simulation of landscaping at an estimated five years of growth on the project site at the KOP location (see **Visual Resources Figure 20**). Over time, as the project's landscaping matures, the visual impact at this KOP and KOP 2 would become less and less while improving the appearance of the project site.

The overall visual change caused by the proposed project's structures is considered to be moderately high as a result of a high visual contrast, high visual scale, and moderately low view disruption.

Staff concludes the introduction of proposed project's publicly visible structures would not substantially degrade the existing viewshed at KOP 3. When considering the overall visual sensitivity of the viewing group at KOP 3 (motorist [moderately low]), and overall visual change of moderately high, the introduction of the project structures would generate a less than significant visual effect at this KOP.

KOP 4 – Depot Road East of Intersection of Industrial Boulevard

Visual Resources Figure 21 represents the existing view towards the proposed project site from the street frontage of a single family residence on the north side of Depot Road, east of the intersection with Industrial Boulevard. The location is approximately 1,000 feet north-northeast of the project site.

As Figure 21 shows, the KOP view is obstructed towards the proposed project site by natural and man-made elements, specifically, ornamental landscaping consisting of trees along Depot Road and Industrial Boulevard, and by the Life Chiropractic College West building. The proposed project's structures would generate a less than significant visual effect to the KOP 4 viewshed.

KOP 5 – Depot Road at Monte Vista Drive

Visual Resources Figure 22 represents the existing view towards the proposed project site from the street frontage of a single family residence on the north side of Depot Road, approximately 1,800 feet north-northeast of the project site.

As Figure 22 shows, the KOP view is obstructed towards the proposed project site by natural and man-made elements, specifically, a commercial building, transmission/utility poles and ornamental landscaping consisting of trees. The proposed project's structures would generate a less than significant visual effect to the KOP 5 viewshed.

LINEARS

<u>Overhead Transmission Lines</u>

The project's overhead transmission lines would be supported by new 115-kV transmission wood or steel poles in the existing corridor of PG&E's 12-kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115-kV transmission lines, the 85-foot pole structures would support the 115-kV transmission lines with underbuilt 12-kV distribution lines and a 90-foot pole structure would be placed on the south side and 60-foot pole structure on the north side of Highway 92.

Motorists traveling through the Industrial Corridor largely consist of patrons and workers of a commercial or industrial operation within it. In general, the estimated level of a motorist's concern (motorist largely consisting of patrons or workers of a commercial or industrial operations in the Industrial Corridor) towards protecting preserving the existing street view of Clawiter Road is considered to be low.

If steel colored poles were to be used, the project with its taller transmission pole lines would introduce a moderate to high contrast among the dark colored ornamental vegetation and buildings that front Clawiter Road. If wood poles were to be used, a moderate to moderately high degree of contrast is anticipated. The line of single circuit transmission poles would introduce a moderate to high contrast with the light blue color of the sky within the street view. The transmission poles would block a small portion of sky in the street view. The degree of view blockage by the poles and overhead wires would be low. The proposed 95-foot tall transmission poles at the State Route 92 crossing location would also occupy only a minor part of the highway view for motorists. The poles would be prominent since they would be located within State Route 92 motorists' normal cone of vision and would be see within the skyline. Given the low to moderate visual sensitivity of the viewshed, the construction of the 115 kV overhead transmission line would introduce a less than significant visual disturbance along the proposed transmission line alignment.

Pipelines

Natural gas, potable water, and sanitary sewer service would be supplied to the project site by means of new underground pipelines connecting to existing gas, water and sewer lines that run underneath Clawiter Road in front of the project site. After construction, the ground surfaces would be restored as required by condition of certification **VIS-1**. The project's proposed underground pipelines at operation would not introduce a visual impact.

PUBLICLY VISIBLE WATER VAPOR PLUMES

Staff analyzed the proposed power plant's emission of water vapor plumes during operation and the potential to generate a visual impact to the area.

The project does not involve the use of a wet cooling tower which is the main generator of visible water vapor plumes. In addition, as a result of the very high exhaust temperature (minimum 670 degrees Fahrenheit) of the proposed project's lean burn[3] engines and generators, and the project's proposed use of dry cooling, under normal weather conditions there is no potential for visible water vapor plumes to form at the Eastshore project site. This conclusion is based on the applicant's proposed facility design at operation.

D. LIGHT OR GLARE

CEQA checklist question: "Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

Existing sources of night lighting in the vicinity of the project site include street and vehicle lights, parking lot lighting, and area and perimeter lighting of existing commercial and industrial operations for safety and security.

The proposed project during operation has the potential to introduce light offsite to surrounding properties, and up-lighting to the nighttime sky. If typically bright exterior

[3] Lean burn refers to a type of engine that runs very fuel lean so that the moisture content in the exhaust is considerably lower than typical internal combustion engine (less than half).

lights were not hooded, and lights not directed onsite they could introduce significant light or glare to the vicinity. The applicant states some nighttime lighting will be required for operational safety and security. There will be additional visible lighting associated with the project stacks and open site areas. High illumination areas not occupied on a regular basis will be provided with switches or motion detectors to light these areas only when occupied. The offsite visibility and potential glare of the lighting will be restricted by placement of lights to direct illumination into only those areas where it is needed (EEC 2006a, pg. 8.11-14).

Staff believes that the applicant's proposed light mitigation would reduce offsite light impacts; however, the description does not specifically identify what mitigation measures will be used during the project's operation. Staff has proposed condition of certification **VIS-3** which requires submittal and approval of a lighting control plan. With the effective implementation of the proposed light mitigation measures, staff believes that the Eastshore project would not result in a substantial new source of light that could adversely affect existing nighttime views.

The project site is approximately one mile from the Hayward Executive Airport; as a result Energy Commission staff has recommended the installation of one non-blinking red aviation obstruction light on each of the project's fourteen 70-foot tall exhaust stacks to identify the power plant's thermal plume emission to airplanes. For a discussion on the aviation obstruction lighting refer to the **Traffic and Transportation** section of this Final Staff Assessment (FSA). For the purposes of the aesthetic discussion, a red obstruction light is used to increase the conspicuity of an object during nighttime. As shown in the KOP 1-5 viewsheds, ground level views of the project's publicly visible structures which included the 70-foot tall exhaust stacks were found to be obstructed by existing man-made and natural elements. A direct ground level view of a red aviation obstruction light would be limited mainly to the KOP 2 and KOP 3 viewsheds, and potentially to distant viewers in the hills in the eastern part of the city (approximately three miles from the project site).

KFAX-AM radio station owns four 228-foot-tall radio towers approximately 3,000 feet southwest of the project site on Enterprise Avenue in the Industrial Corridor. The towers are approximately 1.3 miles from the runway at the Hayward Executive Airport. The four radio towers currently have Federal Aviation Administration required aviation obstruction lighting consisting of three red flashing lights on each tower.

The potential introduction of the described red lights would not substantially degrade the quality of the nighttime view due to existing man-made and natural obstructions, the use of a low intensity of lighting, and the blending of the light with other nighttime lighting occurring within the Industrial Corridor.

The photo simulation of the completed power plant provided by the applicant shows the use of a surface treatment on major project structures and buildings consisting of shades of off white, beige, tan, and neutral colors and flat finishes (see **Visual Resources Figure 15**). With effective implementation of the applicant's proposed surface treatment, project structures would not be a source of substantial glare. Staff has proposed condition of certification **VIS-2** which requires submittal of a surface

treatment plan for the power plant structures and the electric transmission line poles to ensure this conclusion.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in an area may create significant impacts. A significant cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) views of a scenic resource is impaired; or (3) visual quality is diminished.

The project is to be constructed in the “Industrial Zone” district within the 3,500 acre “Industrial Corridor” of the city of Hayward. Approximately 2,500 acres are currently devoted to various commercial and industrial operations. Fremont Bank Operations Center adjoins the project site to the south and fronts Clawiter Road. The operations center can be visually described as a two-story brick office building with ornamental landscaping of the grounds and employee parking area. Parking area landscaping consists of mature trees in tree wells. Also, mature trees line the operations center border with the Eastshore project site (see **Visual Resources Figure 23** – View of Fremont Bank Operations Center South of Project Site). The Fremont Bank Operations Center is not open to the general public to conduct personal banking services. A bank operations center typically is an extensive computer and processing facility for checks, credit cards, mortgages, and phone calls that serves a group of bank branches.

Berkeley Farms operates a 228,000 square foot facility on a 20 acre site (where milk is processed, and packaging and distribution of other diary products takes place)(see **Visual Resources Figure 24** – Landscape Photo from Enterprise Avenue west of Clawiter Road of Berkeley Farms Inc.). The Berkeley Farms facility is approximately 950 feet south of the proposed Eastshore project main entrance. Also on Clawiter Road, further south (approximately 1,800 feet south of the Eastshore entrance), is the Gillig Corporation plant where heavy duty transit buses are assembled (see **Visual Resources Figure 25** - Landscape Photo - Clawiter Road Near Enterprise Looking Towards Gillig Corporation). The Rohm & Hass Chemical Company, Hayward Plant, an acrylic chemical processing facility with a 180-foot tall exhaust stack, is approximately 3,000 feet south-southwest of the project site (see **Visual Resources Figure 6**).

Within a one mile radius of the Eastshore Energy Center site, there are approximately 10 pending development projects. It is expected that the city of Hayward decision-makers will review and approve or deny these projects within the next six months (EEC 2006a, pg. 8.4-10).

A project approximately 3,000 feet west of the project site is the Russell City Energy Center. The 600 megawatt project was originally certified by the Energy Commission on

September 11, 2002, and is expected to begin construction in 2008. The Russell City Energy Center is to have two 146-foot tall exhaust stacks.

The introduction of the proposed projects publicly visible structures, lighting and glare to the already developed 2,500 acres of industrial uses within the 3,500 acre Industrial Corridor is not considered to substantially alter the viewshed, or degrade the visual quality of the "Industrial Corridor." In addition, in the KOP 1, KOP 2, KOP 3, KOP 4 and KOP 5 viewsheds there are no identified scenic resources.

The addition of publicly visible structures by the proposed Eastshore project and the licensed Russell City Energy Center would add to the existing congregation of industrial structures in the Industrial Corridor. The power plant projects would be visually compatible with existing heavier industrial uses within the Industrial Corridor.

While project-related nighttime light and daytime glare impacts on the project site would be mitigated to a level that would be less than significant, existing light and glare levels in the vicinity of the project would increase cumulatively as a result of the project and, existing and planned land uses. Light and glare impacts generated by these projects would not be cumulatively considerable with the effective implementation of the applicable requirements of the city of Hayward Municipal Code and the California Energy Commission. Staff concludes that the introduction of the projects would generate a less than significant cumulative visual effect specific to aesthetics, or preservation and protection of sensitive visual resources.

Staff has reviewed Census 2000 information (maps) that shows a minority population greater than fifty percent within a six-mile radius of the proposed power plant (see the **Socioeconomics** section of this FSA, **Socioeconomics Figure 1**). **Socioeconomics Figure 1** shows an identified minority population within a one mile radius north of the project site. The identified minority population may potentially have exposure to the project's publicly visible structures, lighting or glare. Staff has determined that all significant direct or cumulative impacts specific to aesthetics, or the preservation and protection of sensitive visual resources resulting from the construction or operation of the project would be mitigated. Therefore, the proposed project would not introduce a visual resources related environmental justice issue.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 2 provides an analysis of the applicable LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources relevant to the proposed project. Conditions of certification are proposed to make the project conform to a LORS where appropriate.

VISUAL RESOURCES Table 2
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Local			
City of Hayward General Plan Land Use Policies			
Infill Development	Policies promote infill development that is compatible with the overall character of the surrounding neighborhood (see below).		
	• Encourage visual integration of projects of differing types or densities through the use of building setbacks, landscaped buffers, or other designed features.	YES AS PROPOSED	The Eastshore project is to be constructed in the "Industrial Zone" district within the 3,500 acre "Industrial Corridor" of the city of Hayward. Approximately 2,500 acres are currently devoted to various industrial uses. The Eastshore project involves the use of a 6-acre site. Properties surrounding the site have existing industrial and commercial operations. The power plant project would be visually integrated with existing taller heavier industrial uses within the industrial corridor; such as Berkeley Farms which operates a 228,000 square foot facility on a 20 acre site, where dairy products are processed, packaged and distributed; the Gillig Corporation plant where heavy duty transit buses are assembled; and the Rohm & Hass Chemical Company, an acrylic chemistry processing facility with a 180-foot tall exhaust stack. The project's Power Block A is shown on the site plan to have a 300-325-foot setback from Clawiter Road. The applicant has provided a conceptual landscape plan which shows trees, shrubs, and ground cover in the front, side, and rear yard areas on the site.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
City of Hayward Zoning Ordinances			
• Section 10-1.1630 Yard Requirements	Minimum Front Yard (Standard Street): 10 feet Minimum Side Yard: None Minimum Side Street Yard: 10 feet Minimum Rear Yard: None	YES AS PROPOSED	As depicted on the site plan, the project would comply with the yard requirements.
• Section 10-1.1635 Height Limit	Maximum building height: • Industrial building: No Limit • Office building: 40 feet	YES AS PROPOSED	The project would comply with the building height provisions. There are no height limitations for industrial buildings. As shown on the project's elevation plan, the height to the top of the vent hood on the top of Power House A is 35-feet 11-inches.
	Maximum height for fences, hedges, walls: (1) Front and street yard: 4 feet (2) Side and Rear Yard: No Limit	YES AS PROPOSED	As depicted on the conceptual landscaping plan and shown on the photo simulations, a 6-foot tall slat inserted fence is to be installed. It would be located outside of the required 10-foot front yard area.
• Section 10-1.1640 Site Plan Review	Site Plan Review approval is required before issuance of any building, grading, or construction permit within this district only if the Planning Director determines that a project is incompatible with City policies, standards and guidelines. Site Plan Review approval may also be required for fences (i.e., such as anodized gray chain link fences along corridor streets) in certain circumstances.	YES AS CONDITIONED	Staff's has recommended aesthetic related conditions of certification **VIS 1-6** which pertain to surface treatment of buildings and structures, lighting, landscaping, outdoor storage and signs, and include a provision that allows for review and comment by the city of Hayward.
•Section 10-1.1645 Minimum Design and Performance Standards - Industrial Buildings and Uses	This section establishes design and performance standards that shall apply to the construction of industrial and commercial buildings and uses in the (I) Industrial District. The applicable standards pertinent to visual resources are summarized below		
	a. Accessory Buildings, Detached. Shall not exceed one story (1).	YES AS PROPOSED	The accessory buildings shown on the project's elevation drawings do not exceed one story.
	b. Additions and Accessory Structures Attached to Primary Building.	YES AS PROPOSED	There is no maximum building height for an industrial building within the Industrial Zone. The Eastshore project is a simple

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
	Additions and accessory structures attached to the primary building shall meet all the development standards required of the primary building.		cycle power peaking plant involving 14 Wartsila natural gas-fired reciprocating engine generators that use fourteen 70-foot tall exhaust stacks. The exhausts stacks are attached to the Power House A, the primary building (see VISUAL RESOURCES Figure 4).
	f. Architectural Design Principles. • Incorporate design elements that are harmonious and in proportion to one another (1). • Incorporate an attractive mixture of color and materials. Select building materials and colors that are harmonious with the site and surrounding uses, buildings and area. Base colors shall be low reflective, subtle, neutral. Building trim may feature brighter accent colors (2). • Create shadow relief with recesses, columns, score lines, trellises, windows, or other features on blank wall when they are visible from adjacent streets (4). • Building facades in excess of 100 feet long and/or greater than 20 feet in height shall be setback a minimum of 20 feet from the front property line and must incorporate recesses and projections which may include windows and trellises (5). • New buildings shall use roof parapet walls to screen rooftop mechanical equipment (6). • Any metal clad building which is visible from a street shall adhere to these design criteria. Unpainted (gray galvanized) metal surfaces shall not be used on primary structures (7). • Truck loading areas shall not face the street, unless no practical alternative exists (8). • Industrial facilities, whose building design is utilitarian by necessity, shall be screened with landscaping (9)	YES AS CONDITIONED	• The project design elements as shown in the photo simulations and elevation drawings are harmonious with one another. (1) • The photo simulations for the project show use of neutral colors that are harmonious with the site and surrounding buildings. Condition of certification **VIS-2** would ensure that building materials and colors would be harmonious with the site and surrounding area. (1, 2) • The front side of Power Block A is shown to not be a blank wall facing Clawiter Road. In addition, the view from Clawiter Road to the front wall of the Power Block A would be disrupted by landscaping along the site's road frontage as shown on the conceptual landscape plan and in the photo simulations. (4), (6) • The Power Block A is shown to have a greater than 20-foot setback (approximately 300-foot setback) from the front property line, and incorporates recesses that consist of a door entry and window and a second door entry as shown on VISUAL RESOURCES Figure 4. (5) • The project's elevation drawings do not show the installation of roof top mechanical equipment. (6) • No metal clad buildings visible from Clawiter Road are proposed by the applicant. In addition, proposed project landscaping along the street frontage is to be 85 feet thick and includes a slat inserted fence for visual screening. (7) • Truck loading areas are not shown on the project's site plan to face Clawiter Road. (8) • The applicant has provided a

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
			conceptual landscaping plan for the project site. Publicly visible power plant structures would be partially screened by the landscaping as it grows towards maturity. Ground level views of the plant would be screen by landscaping, and by use of slat inserted fencing. (9)
	i. Fences, Hedges, Walls. • Fences, hedges and walls shall not exceed a height of 4 feet in a required front yard, or side street yard (1). • For fences limited to a maximum of 4 feet in height, the height limit shall not be exceeded at grade measured on either side of the fence (3).	YES AS PROPOSED	As depicted on the project's conceptual landscaping plan, site plan and shown on photo simulations, an approximate 6-foot tall slat inserted fence would be located outside of the required 10-foot front yard.
	l. Landscaping. • Landscape Areas. Required front, side, side street, and rear yard areas shall be landscaped except for permitted driveways, and walkways. All other areas not utilized for structures or paving shall be landscaped unless otherwise authorized by the Planning Director or other approving authority because of site constraints, existing or adjacent site conditions, or phased development (a). Required landscape areas shall be planted with water conserving trees, shrubs, turf grass, ground cover, or a combination thereof (c). • Buffer Trees/Landscaping. Masonry walls, solid building walls, trash enclosures, and/or fences facing a street or driveway shall be buffered with continuous shrubs or vines (b). • Parking Lot Trees/Planters. Parking areas shall include a minimum of one 15-gallon parking lot tree for every 6 parking stalls, unless an alternative tree planting is approved by the City Landscape Architect (a). Parking and loading areas shall be buffered from the street with shrubs, walls, or earth berms.	YES AS CONDITIONED	•The project's conceptual landscape plan shows landscaping in the required yard areas (a). •The city has recommended landscape screening, which could include landscaping with a berm and/or wall. The use of a perimeter wall to screen lower level plant facilities would also be appropriate •The project's conceptual landscape plan and plant palette shows a combination and variety of trees and ground cover. (a) (b), (c), (e) •Proposed project landscaping along the street frontage is to be 85 feet thick and includes a slat inserted fence for visual screening. Landscaping includes evergreen shrubs (Escallonia) and evergreen ground cover (Ceanothus "Yankee Point") among the proposed plants. (b), (e) • The conceptual landscape plan shows the planting of a 15-gallon redwood tree on the south side of the proposed six permanent parking spaces behind the switchyard. (a)

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
	Where shrubs are used for buffering, the type and spacing of shrubs shall create a continuous 30-inch high screen within 2 years (e). • Street Trees. Street trees shall be planted along all street frontages at a minimum of one 24-inch box tree per 20 to 40 lineal feet of frontage or fraction thereof, except where space is restricted due to existing structures or site conditions. • Irrigation. Within all required landscaped areas, an automatic water efficient irrigation system shall be installed upon initial construction of any building or substantial alteration to any building or site. • Maintenance. After initial installation, all plantings shall be maintained in a reasonably weed-free and litter-free condition, including replacement where necessary (a). Required street, parking lot, and buffer trees shall not be severely pruned, topped, or pollarded (cut back to the trunk) (b).		• Applicant has stated that proposed street trees along Clawiter Road shall be consistent with the city's landscape requirements. The applicant's conceptual landscaping plan shows 15-gallon container sized trees along the street (street trees) rather than the city's street tree requirement of a 24-inch box tree. The 24-inch box tree is more mature than a 15-gallon tree. Condition of certification **VIS-4** would ensure compliance with the city's landscaping requirements, and that landscaping is installed and maintained in a manner acceptable to the city.
	m. Lighting, Exterior. Exterior lighting and parking lot lighting shall be provided in accordance with the Security Standards Ordinance and be designed by a qualified lighting designer and erected and maintained so that light is confined to the property and would not cast direct light or glare upon adjacent properties or public rights-of-way. Such lighting shall also be designed such that it is in keeping with the design of the development.	YES AS CONDITIONED	The project owner has proposed measures to control light trespass beyond the boundaries of the project. Highly directional light fixtures and shielding of lighting to reduce light scatter and glare are to be used. Condition of certification **VIS-3** would ensure compliance with this standard.
	n. Outdoor Storage. All uses shall be conducted wholly within enclosed buildings. Minor open storage is a secondary use and is permitted, provided the materials, products, or equipment stored are necessary to the operation of the use being conducted on the site. Storage shall not be placed within required yard or parking areas, and the storage shall be compatible with adjoining uses (for example, adequately	YES AS CONDITIONED	An outdoor storage area is not shown on the project's site plan or landscape plan. Staff has recommended a condition of certification **VIS-5** to ensure compliance with this provision.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	screened, set back or not too high, and not visually unpleasant).		
	q. Roof-Mounted Equipment. Roof-mounted equipment, antennas, satellite dishes, support structures and similar devices shall be screened from public view, preferably by the roof form.	YES AS PROPOSED	The elevation drawings of the project provided in the AFC do not show equipment mounted on the roof.
	r. Signs. Signs shall be of a design in harmony with the environment and shall not constitute excessive visual impact.	YES AS CONDITIONED	The applicant has proposed minimal signage and project construction signs. The signs installed would be made of non-glare materials and unobtrusive colors. Condition of certification **VIS-6** would ensure compliance with this provision.
	t. Trash and Recycling Facilities. Trash and recycling facilities shall be adequately screened from view, utilizing a decorative wood or masonry wall or combination thereof.	YES AS PROPOSED	No trash facilities are depicted on the site plan. The landscaping proposed along the perimeter of the site would sufficiently screen any proposed trash and recycle facilities from public view.
	u. Truck Loading Facilities. Loading areas should not dominate the street frontage, and should not directly face a major street unless no practical alternative exists.	YES AS PROPOSED	A truck loading area does not directly face or dominate the street frontage as shown on the photo simulations or site plan.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

CITY OF HAYWARD CORRESPONDENCE DATED APRIL 19, 2007

A letter dated April 19, 2007 was received from David Rizk, Planning Manager for the city of Hayward (docketed April 23, 2007), pertaining to the Russell City Energy Center and Eastshore Energy Center projects.

Mr. Rizk identifies the city's letter "d" finding for the issuance of a conditional use permit in the letter which states the purpose of the Hayward Zoning Ordinance is to "promote the public health, safety, general welfare and preserve and enhance the aesthetic quality (underline added) of the City by providing regulations to ensure an appropriate mix of land uses in an orderly manner."

Mr. Rizk states to reduce visual and aesthetic impacts, landscape screening, which could include landscaping with a berm and/or wall, should be provided at each site, and especially for the Eastshore site, which is closer to residential areas. The use of a perimeter wall to screen lower level plant facilities would also be appropriate. He does not feel that the stacks can be mitigated to an insignificant level, though their impact could be mitigated somewhat if they were more of a neutral color that would blend with

the background. Finally, lighting provided should meet the city's Security Ordinance standards, with light sources shielded so as not to shine or glare offsite.

Staff response – The project site is within an Industrial District (zone district) within the Industrial Corridor of the city of Hayward. Therefore, staff used the city of Hayward's adopted LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources specific to the industrial zone district relevant to the project (see **Visual Resources Table 2**). Conditions of certification have been recommended by staff to make the project conform to a city LORS. Specifically regarding Mr. Rizk's comment pertaining to landscape screening, the applicant has provided a conceptual landscape plan which shows a berm along the project site's frontage with Clawiter Road (see **Visual Resources – Figure 16**). Regarding his comment about the exhaust stacks, condition of certification **VIS-2** requires the project owner to treat all project structures and buildings visible to the public using appropriate surface treatments. Condition of certification **VIS-3** addresses his comment pertaining to lighting.

PUBLIC COMMENT RECEIVED DURING ENERGY COMMISSION DATA RESPONSE & ISSUE RESOLUTION STAFF WORKSHOP ON MAY 23, 2007

1. A comment pertaining to aesthetic/visual sensitive resources was received from a member of the public who requested that transplanted large trees be included in the landscaping for the Eastshore project site.

   Staff response – Staff has recommended condition of certification **VIS-4** which requires that the applicant provide landscaping that complies with the city of Hayward municipal code requirements stipulated in section 10-1.1645 I.

   Landscaping. The applicant's fulfillment of this condition of certification could include one of several planting methods: balled-and-burlapped trees which includes transplantation of large trees, bare-root trees (usually extremely small plants), or container-grown trees (ranges from small plants in gallon pots up to large trees in huge pots). The applicant's conceptual landscaping plan shows the planting of 15-gallon container sized trees along Clawiter Road (street trees). The city's street tree size requirement is a 24-inch box tree. The 24-inch box is the smallest common box size. The 24-inch box tree is more mature than a 15-gallon tree.

   Staff researched tree planting and transplantation and found that smaller plants live better, establish faster and are more economical than large plants. Many consumers want the "instant" landscape look. Demand for large landscape-size trees has increased over the last decade. With large mechanical digging equipment, 6-to 8-inch diameter trees can be moved. Large diameter trees are often transplanted for instantaneous effect, but post-transplant stress and cost increase with the size of the tree (NCCES 1997).

   Smaller trees of a particular species typically transplant better and catch up in growth to larger trees of the same species. As a general rule, for each inch in caliper, a year is required for transplant recovery; therefore a 4-inch caliper tree may require four years to recover from the transplant procedure before normal, active growth resumes (NDSU 1998).

Transplanting large trees results in an extreme imbalance of root (shoot ratio). When a major portion of the roots is lost, the capacity to absorb water from the soil is reduced proportionally. Research shows that it takes as long as 2 months for new roots to be initiated from the callus formed after the root was severed. It can be as long as 3 months before the regenerated roots absorb moisture outside the root ball, and at least 5 months until soil moisture is absorbed at the similar rates from the root ball and the backfill soils. As the root system expands, top growth (crown) will continue to increase. When the root system has grown back to its original ratio, normal crown vigor will return. Most studies indicate that the period of reduced vigor following transplanting will last about one year per each inch trunk caliper. It will take a 3-inch transplanted tree three years to regain original root shoot ratio (NCCES 1997).

Container-grown trees (trees grown in pots for several years) are often more transplant tolerant than field-grown or established trees (NDSU 1998). Generally, container grown plants are the easiest to plant and successfully established in any season. The main disadvantage of container-grown plants is the possibility of deformed roots. “Rootbound” plants have roots circling inside the container. The entangled roots are a physical barrier to future root growth and development. If this condition is not corrected at planting time, the plant may experience slow growth and establishment because of the girdled roots (NDSU 1998).

2. A comment pertaining to aesthetic/visual sensitive resources was received from a member of the public who asked if the proposed Eastshore project could be seen from the Fairview area.

   Staff response – The Fairview community is located approximately 5 miles north-northwest of the Eastshore project site. The 5-mile distance was measured between the project site and the large water tank along Old Fairview Avenue in the Fairview community (elevation 600-650 feet) in the city of Hayward.

   Staff visited an open view location in the direction of the proposed Eastshore project site near the junction of Fletcher Lane and Walper Street approximately two miles west of the Fairview community (see **Visual Resources Figure 26** – Landscape Photo Near Junction Of Fletcher Lane and Walper Street, Approximately 3 Miles from Project Site). In the distance, the 180-foot tall exhaust stack at the Rohm & Hass Chemical Company can be seen. The Rohm & Hass facility is approximately 3,000 feet south-southwest of the Eastshore project site. The Eastshore project proposes use of fourteen 70-foot tall exhaust stacks. At this location three miles from the project site, the exhaust stacks would blend within the urban viewshed.

PUBLIC COMMENT RECEIVED DURING THE ENERGY COMMISSION PRELIMINARY STAFF ASSESSMENT WORKSHOP ON SEPTEMBER 6, 2007

1. An aesthetic/visual sensitive resources related comment was received from a member of the public who said the project could have been more architecturally pleasant; facility plans should have been submitted to local art aficionados for their review and approval.

Staff response – The proposed power plant is to be built in the city of Hayward's designated "Industrial Corridor" in an "Industrial" zone district. The city provides minimum design and performance standards for industrial buildings and uses in section 10-1.1645 of the city municipal code (see **Table 2** in this analysis). The project as proposed and conditioned meets the stated city standards. Section 10-1.1645 does not require a project owner applying for a building permit to construct an industrial building in the Industrial Corridor to submit plans to local art aficionados for their approval.

2. Aesthetic/visual resources related comments received from several members of the public expressed concerns that residents in a nearby neighborhood would experience visual impacts if the power plant were to be built.

   Staff response – Staff's visual analysis includes four KOPs from residential locations closest to the project site (see **VISUAL RESOURCES Figures 9, 11, 21, and 22**). The views from these four KOP locations to the project site are obstructed by existing natural and man-made elements in the physical setting. In addition, lights are to be hooded and directed onsite during nighttime and there would be no publicly visible water vapor plumes emitted at operation. Staff used the thresholds for "aesthetics" established by the Secretary of the Resources Agency (CEQA Guidelines), and the city of Hayward's minimum design and performance standards for industrial buildings to conduct the project's review. Staff concluded that the proposed project would not introduce a substantial aesthetic impact to nearby residential neighborhoods.

CITY OF HAYWARD CORRESPONDENCE DATED OCTOBER 9, 2007

A letter dated October 9, 2007 received from Gregory T. Jones, City Manager of the city of Hayward included two aesthetic/visual related comments pertaining to the proposed Eastshore Energy Center project.

1. A city comment states "VIS-8 (Open Storage): Minor open storage should be defined in accordance with the Hayward Zoning Ordinance (no more than 10 percent of open yard areas)."

   Staff response – There is no VIS-8 in the visual resources section of the Energy Commission Preliminary Staff Assessment (PSA). Staff recommended condition of certification VIS-5 to address outdoor storage. VIS-5 wording originates from that stated in the city of Hayward's zoning ordinance for the "Industrial District," section 10-1.1645 Minimum Design and Performance Standards. (n) Outdoor Storage. This section states the following:

   > "All uses shall be conducted wholly within enclosed buildings. Minor open storage is a secondary use and is permitted, provided the materials, products, or equipment stored are necessary to the operation of a use being conducted on the site. Storage shall not be placed within required yard or parking areas, and the storage shall be compatible with adjoining uses, as determined by the Planning Director (for example, adequately screened, set back or not too high, and not visually unpleasant as with outside storage of appliances in conjunction with appliance sales/service)."

2. Another comment states the City takes exception to staff's determination of minimal impact of new 80-foot tall 115-kV transmission line poles interspersed with existing 12-kV transmission poles along Clawiter Road, a major access point to the city's industrial area. During earlier presentations on the project, the city was lead to believe new metal transmission line poles would be erected and carry both transmission lines; thereby removing at least one set of poles.

   Staff response – A letter was received from David Stein dated September 19, 2007 (docketed September 19, 2007). Mr. Stein, the applicant's AFC Project Manager, provided written comments on the PSA. Specific to the transmission line (tie line), Mr. Stein indicates the 1.2-mile transmission line would be supported by new 115-kV transmission wood or steel poles in the existing corridor of PG&E's 12-kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115-kV transmission lines, the 85-foot pole structures would support the 115-kV transmission lines with underbuilt 12-kV distribution lines to accommodate the existing PG&E transmission lines along Clawiter Road, and a 90-foot pole structure would be placed on the south side and 60-foot pole structure on the north side of Highway 92. A few existing wood poles may remain to allow an existing 12-kV drop down line to continue its service to a commercial or industrial operation along Clawiter Road.

   The project's overhead transmission line is not anticipated to generate a substantially significant visual disturbance to motorist along this segment of Clawiter Road. Motorist using Clawiter Road largely consists of patrons or workers of commercial or industrial operations in the Industrial Corridor. The level of a patron or worker's aesthetic concern about a view of the project's overhead transmission line is anticipated to be low.

CONCLUSIONS

The visual analysis focused on two main issues; (1) would construction and operation of the project cause an aesthetic impact under CEQA; and (2) would the project comply with applicable local LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources.

1. The project is to be constructed in the "Industrial Zone" district within the "Industrial Corridor" of the city of Hayward in Alameda County. Land uses surrounding the project site are visually described as commercial and industrial uses.

2. The project would not cause a significant visual impact to a scenic vista. There are no identified scenic vistas in the viewsheds of KOPs 1 through 5.

3. The project would not cause a significant visual impact to a scenic resource. There are no identified scenic resources in the viewsheds of KOPs 1 through 5.

4. The project site does not have frontage, or traverse a segment of road recognized as a National Scenic Byway or All American Road, or a State Scenic Highway.

5. The project would introduce a less than significant impact to the visual character or quality to the site and the surrounding area with the effective implementation of the conditions of certification.

6. There would be no publicly visible water vapor plumes emitted by the project at operation during normal weather conditions based on the applicant's proposed facility design.

7. The project would generate a less than significant new source of light or glare to nighttime or daytime views with the effective implementation of the conditions of certification.

8. The project's publicly visible structures may potentially be seen by an identified minority population of greater than fifty percent. Staff has determined that all significant direct, indirect or cumulative impacts specific to visually sensitive resources resulting from the operation of the project would be mitigated. Therefore, the proposed project does not introduce a significant visual resource related environmental justice issue.

9. With the effective implementation of the mitigation measures that the project owner has agreed to, and staff's recommended visual resource conditions of certification, the construction and operation of the project would not contribute significantly to a cumulative visual impact to adjacent land uses.

10. The project would comply with all applicable local laws, ordinances, regulations, and standards pertaining to aesthetics, or preservation and protection of sensitive visual resources.

The construction and operation of the Eastshore Energy Center as proposed, with the effective implementation of the applicant's proposed design measures and staff's recommended conditions of certification (below) would ensure that visual resource impacts generated by the project are less than significant, and ensure that the project complies with all applicable LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources.

PROPOSED CONDITIONS OF CERTIFCATION

Surface Restoration

VIS-1 The project owner shall remove all evidence of construction activities, and shall restore the ground surface to the original condition or better condition, including the replacement of any vegetation or paving removed during construction where project development does not preclude this. The project owner shall submit to the Compliance Project Manager (CPM) for review and approval a surface restoration plan the proper implementation of which will satisfy these requirements. The project owner shall complete surface restoration within 60 days after the start of commercial operation.

Verification: At least 60 days prior to the start of commercial operation, the project owner shall submit the surface restoration plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the surface restoration plan are needed, within 30 days of receiving that notification the project owner shall submit to the CPM a plan with the specified revisions.

The project owner shall complete surface restoration within 60 days after the start of commercial operation. The project owner shall notify the CPM within seven days after completion of surface restoration that the restoration is ready for inspection.

Surface Treatment of Project Structures and Buildings

VIS-2 The project owner shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

The project owner shall submit a surface treatment plan to the CPM for review and approval. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure, building, tank, pipe, and wall; transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. One set of 11” x 17” color photo simulations at life size scale of the proposed treatment for project structures, including structures treated during manufacture at the least from the selected KOP 3 (**Visual** Resources Figure 18);

E. A specific schedule for completing the treatment; and

F. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not request vendor treatment of any buildings or structures during their manufacture, or perform final field treatment on any buildings or structures, until the project owner has received treatment plan approval by the CPM.

Verification: At least 45 days prior to specifying vendor color(s) and finish(es) for structures or buildings to be surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the city of Hayward Community and Economic Development, Planning Division for review and comment. The project owner shall provide the CPM

with the city's comments at least 30 days prior to the estimated date of providing paint specification to vendors.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

Within ninety (90) days after the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from selected KOP 3 at the least.

The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

Permanent Exterior Lighting

VIS-3 To the extent feasible, consistent with safety and security considerations and commercial availability, the project owner shall design and install all permanent exterior lighting such that a) light fixtures do not cause obtrusive spill light beyond the project site; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized, and e) lighting complies with local policies and ordinances. The project owner shall submit to the CPM for review and approval and simultaneously to the city of Hayward Community and Economic Development, Planning Division for review and comment a lighting mitigation plan that includes the following:

A. A process for addressing and mitigating complaints received about potential lighting impacts;

B. Lighting shall incorporate commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

C. Light fixtures shall not cause obtrusive spill light beyond the project boundary;

D. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

E. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 45 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to determine the required documentation for the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to the city of Hayward Community and Economic Development, Planning Division for review and comment a lighting mitigation plan. The project owner shall provide the city's comments to the CPM at least 10 days prior to the date lighting materials are ordered.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not order any exterior lighting until receiving CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been installed and is ready for inspection. If after inspection the CPM notifies the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify the CPM that the modifications have been completed and are ready for inspection.

Within 10 days of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 10 days after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days of complaint resolution.

Landscaping

VIS-4 The project owner shall provide landscaping consistent with the conceptual landscape plan, dated May 4, 2007, shown on **Visual Resources Figure 16**. The landscaping shall comply with the city of Hayward municipal code requirements stipulated in section 10-1.1645 l. Landscaping.

The project owner shall submit to the CPM for review and approval and simultaneously to city of Hayward Community and Economic Development, Planning Division for review and comment a landscaping plan whose proper implementation will satisfy these requirements.

The project owner shall not implement the plan until the project owner receives approval of the plan from the CPM. The planting must be completed by the start of commercial operation, and the planting must occur during the optimal planting season.

Verification: Prior to commercial operation and at least 45 days prior to installing the landscaping, the project owner shall submit the landscaping plan to the CPM for review and approval and simultaneously to city of Hayward Community and Economic Development, Planning Division for review and comment. The project owner shall provide the city's comments 30 days prior to the installation of the landscaping.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and city of Hayward Community and Economic Development, Planning Division a plan with the specified revision(s) for review and approval by the CPM before the plan is implemented.

The project owner shall simultaneously notify the CPM and city of Hayward Community and Economic Development, Planning Division within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

Outdoor Storage

VIS-5 Minor open storage shall be a secondary use permitted on the project site provided the materials, products, or equipment stored are necessary to the operations of the use being conducted on the site. Open storage shall not be placed within the yard or parking areas stipulated by the city's Industrial Zone. Open storage shall be visually compatible with adjoining land uses (for example, adequately screened, set back or not too high, and not visually unpleasant as with outside storage of appliances in conjunction with applicant sales/service). Open storage conducted on the project site shall be subject to the review and approval of the CPM.

Verification: Prior to start of commercial operation, the project owner shall inform the city of Hayward Community and Economic Development, Planning Division and the CPM of the location of proposed open storage area(s), if any, on the project site.

The project owner shall provide any letters pertaining to open storage received from the city of Hayward Community and Economic Development, Planning Division (comments or complaints) to the CPM.

If the CPM notifies the project owner that modifications to the proposed open storage are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify the CPM that the modifications have been completed.

Signage

VIS-6 The project owner shall install minimal signage visible to the public, which shall a) have unobtrusive colors and finishes that prevent excessive glare; and b) be consistent with the policies and ordinances of city of Hayward Community and Economic Development, Planning Division. The design of any signs required by safety regulations shall conform to the criteria established by those regulations. The project owner shall submit a signage plan for the project to the CPM for review and approval and simultaneously to city of Hayward Community and Economic Development, Planning Division for review and comment. The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

Verification: Prior to the start of commercial operation and at least 60 days prior to installing signage, the project owner shall submit the signage plan to the CPM for review and approval and simultaneously to city of Hayward Community and Economic Development, Planning Division for review and comment.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any signage visible to the public is installed.

The project owner shall provide the CPM with electronic color photographs after completing installation of signage.

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COH 2007f – City of Hayward/G. Jones. City of Hayward Staff Comments on the California Energy Commission Preliminary Staff Assessment for the Eastshore Energy Center. 10/9/07.

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EEC 2006a – Eastshore Energy Center, LLC/ G. Trewitt (tn 37923) Application for Certification for the Eastshore Energy Center. 09/15/2006 Rec'd 09/22/2006.

FAA 2007 - Federal Aviation Administration. AC 70/7460-1K Obstruction Marking and Lighting, Appendix 2, effective February 1, 2007.

HRSIC 2007 - Hayward Regional Shoreline Interpretive Center. 2007.

NCCES 1997 - North Carolina Cooperative Extension Service, North Carolina State University College of Agriculture & Life Sciences. Horticulture Information Leaflet 601 – Planting Techniques For Trees And Shrubs, April 1997.

NDSU 1998 - North Dakota State University Extension Service, North Dakota State University of Agriculture and Applied Science, and U.S. Department of Agriculture cooperating, F-1147 - Transplanting Trees and Shrubs, July 1998.

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APPENDIX VR-1

STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff evaluates the visual characteristics of the existing physical setting, the proposed project, the circumstances affecting the viewer, and the degree of visual change that a proposed project may introduce using the elements, and generally accepted criteria for determining substantial environmental impact significance identified below.

ELEMENTS OF THE METHODOLOGY

Key Observation Points

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a "Key Observation Point" [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[4] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area, as appropriate. Prior to application submittal, staff participates in the selection of appropriate KOP(s) for the analysis.

LORS Consistency

Energy Commission staff consider federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to aesthetics, or protection and preservation of visual sensitive resources. Conflicts with such LORS can constitute significant visual impacts. For example visual staff examines land use planning documents, such as a local government's General Plan, Specific Plan, and zoning ordinances applicable to the project site and surrounding area to gain insight as to the type of land uses intended for the area, and the guidelines given for aesthetics, or protection and preservation of visual sensitive resources.

Visible Water Vapor Plume Frequency

When a proposed power plant is operated at times of low temperature and high humidity, the potential exists for the exhaust from its cooling towers to condense and form visible water vapor plumes (steam plume). The formed plume potentially could have an adverse effect on visual sensitive resources in the vicinity of the project.

[4]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

The severity of the visual impacts created by a project's visible plumes depends on five factors: 1) the frequency of the plumes, 2) the physical size of the plumes (dimensions), 3) the sensitivity of the viewers who would see the plumes, 4) the distance between the plumes and the viewers, 5) the visual quality of the existing viewshed; and, 6) whether a scenic resource or vista would be blocked by the plumes.

Staff completes water vapor plume modeling of the proposed project's cooling towers using design parameters provided by the applicant. Staff models the estimated plume frequency and dimensions for the cooling tower and turbine exhaust using the Combustion Stack Visible Plume (CSVP) model, and a multi-year meteorological data set obtained for the area where the project is proposed.

Staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20 percent of the time. Eighty (80) percent of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large, very noticeable to a wide area, but would occur very infrequently.

Staff focuses its frequency of the plumes analysis on the portion of the year when the ambient conditions (i.e., cool/cold temperatures and high relative humidity) are such that plumes are most likely to occur (typically from November through April) and when "clear" sky conditions exist because this is when the plumes would cause the most visual contrast with the sky and have the greatest potential to cause adverse visual impacts. Staff eliminates from consideration plumes that occur at night or during rain or fog conditions because plume visibility, and overall visual quality, is typically low during those conditions. In addition, plumes that occur during specific cloudy conditions are also eliminated because under these conditions, plumes have less contrast with the background sky. A plume frequency of 20 percent of seasonal daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. If it is determined that the seasonal daylight clear hour plume frequency is greater than 20 percent, then plume dimensions are determined and a significance analysis is included in the Visual Resources section of the Staff Assessment for the proposed project.

Plume frequencies of less than 20 percent have been determined to generally have a less than significant impact. If the modeling predicts seasonal daylight clear plume frequencies greater than 20 percent, staff calculates the dimensions of the clear hour plumes and then conduct an assessment of the visual change (in terms of contrast, dominance and view blockage) that would be caused by the 20th percentile plume dimensions. Staff also analyzes the predicted plume's potential luminescence (light refraction resulting in a glare or glow) and color contrast, and opacity (the degree to which light is prevented from passing through an emission plume) that may be introduced to the KOP viewsheds. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change caused by the plumes may result in a significant visual impact.

California Environmental Quality Act Guidelines

The CEQA Guidelines define a “significant effect on the environment” to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance” (California Code of Regulations, Title 14, Section 15382).

Appendix G Environmental Checklist Form of the CEQA Guidelines, under “Aesthetics,” lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff answers each of the four checklist questions for the proposed project, including any related facility such as a transmission line or gas pipeline; and for both construction and operation phases.

APPENDIX VR-2

ENERGY COMMISSION STAFF - VISUAL ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from high (extended) a view of the project site that is reached across a stretched out distance, or amount of time; to, low (brief) a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewers is engaged.

Scenic Resource - a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations is often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern.

Existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, indicate a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure – visibility of a landscape feature, the number of viewers, distance, and the duration of the view are primary factors affecting viewer susceptibility to impacts.

Viewshed – an area visible to an observer from a fixed vantage point (Key Observation Point [KOP]). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46^0 similar to the field-of-view of the

human eye. The staff uses a viewshed that is not to be confused with a panoramic (180^0) or cycloramic (360^0). These are broad horizontal composition with no apparent limits to the view.

Visibility - the level the proposed project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the Key Observation Point.

Visual Contrast - The conspicuousness or prominence of a project, and its compatibility with its setting. Contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Consider the proposed project's introduction of **form** (shape and mass), **line** (changes in edge types and interruption or introduction of edges, bands and silhouette lines), **color** (surface color, reflectivity, and glare), and **texture** (noticeable differences in the grain, or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast**.** Degree of contrast: None – the element contrast is not visible or perceived; Weak – the element contrast can be seen but does not attract attention; Moderate – the element contrast begins to attract attention and begins to dominate the characteristic landscape; Strong – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the block view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Visual Scale - the proposed project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change is a function of visual quality, viewer concern, and viewer exposure.

VISUAL RESOURCES - FIGURE 1

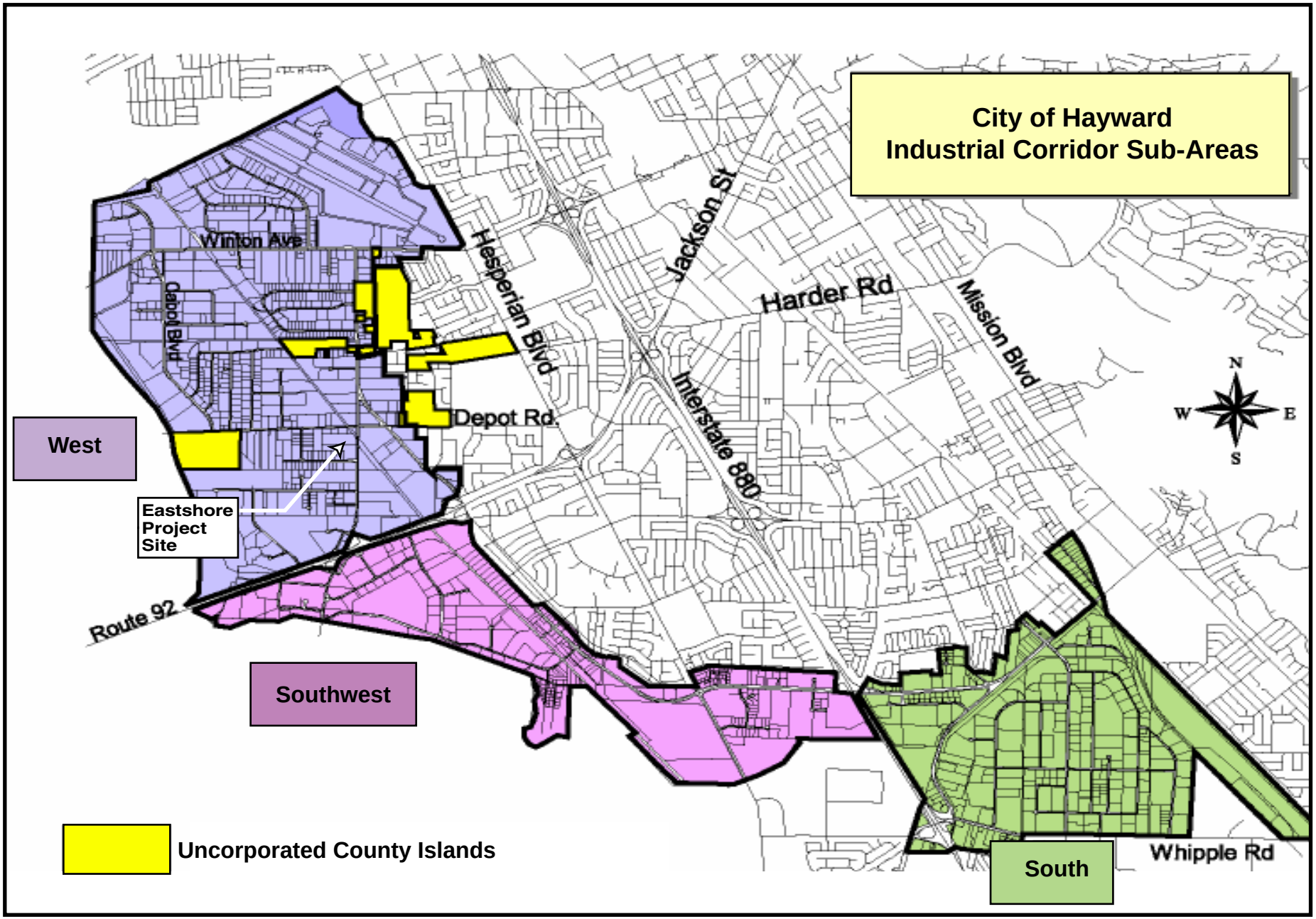
Eastshore Energy Center - Aerial View of Site and Laydown Area

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 2.2-7

VISUAL RESOURCES - FIGURE 2

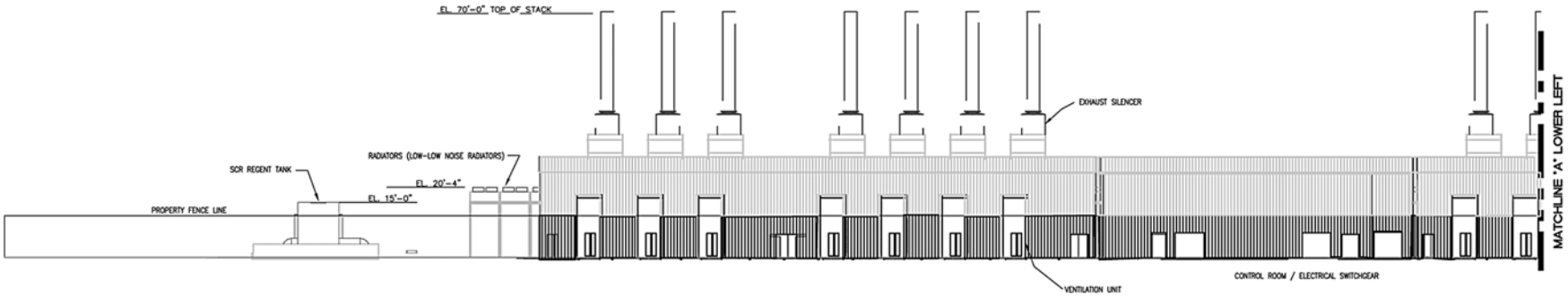
City of Hayward "Industrial Corridor"

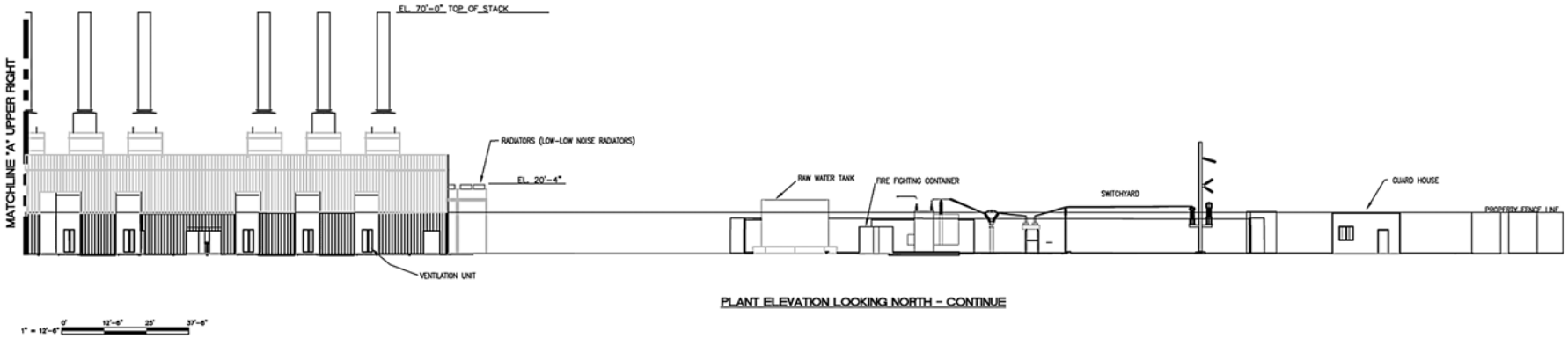


SOURCE: City of Hayward General Plan - Appendix E

VISUAL RESOURCES - FIGURE 3

Eastshore Energy Center - Plant Elevation Looking North



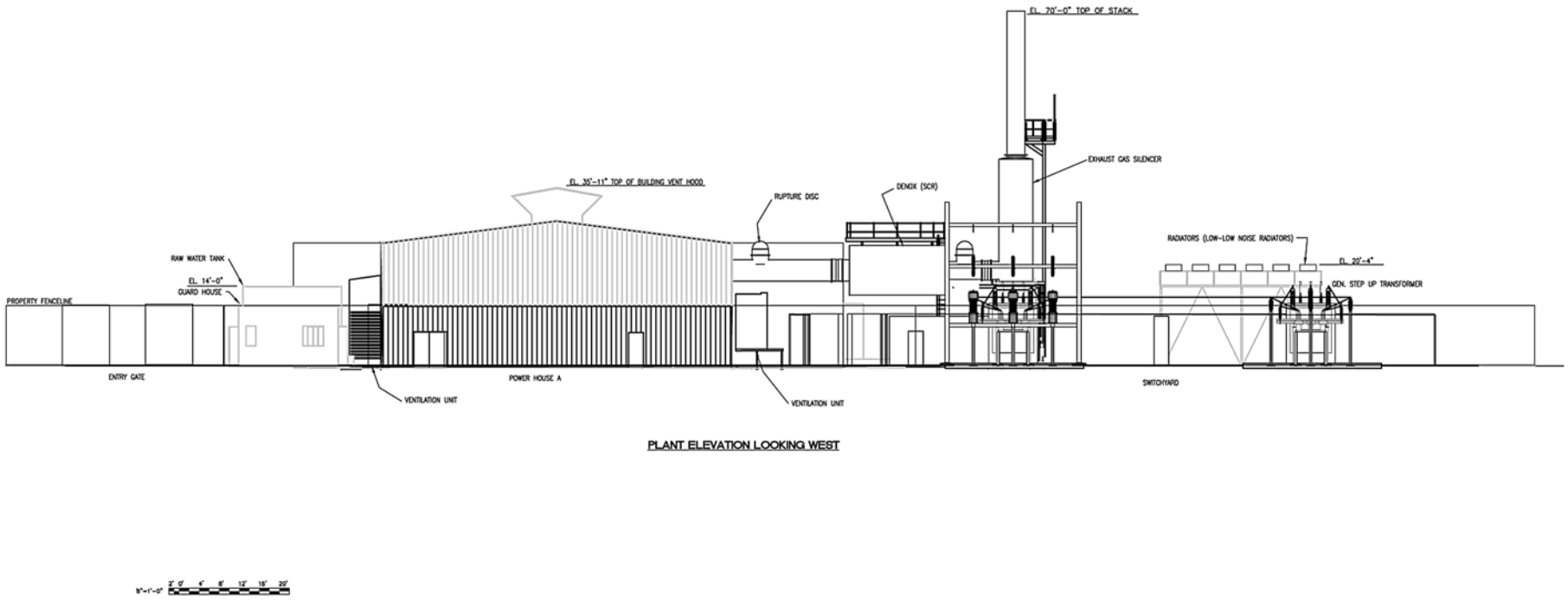


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 1.2-4A

VISUAL RESOURCES - FIGURE 4

Eastshore Energy Center - Plant Elevation Looking West



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 1.2-4B

VISUAL RESOURCES - FIGURE 5

Eastshore Energy Center - Project Site and KOP Location

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 6

Eastshore Energy Center - Landscape Character Photo - Haywood Regional Shoreline Looking Northeast from the Hayward Interpretive Center

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 7

Eastshore Energy Center - Landscape Character Photo of Construction Laydown Area Looking South

SOURCE: Photo taken by CEC staff on January 2007

VISUAL RESOURCES - FIGURE 8

Eastshore Energy Center - Landscape Character Photo - Proposed Construction Laydown Location Looking Toward Life Chiropractic College West

SOURCE: Photo taken by CEC staff January 2007

VISUAL RESOURCES - FIGURE 9

Eastshore Energy Center - KOP 1 - Existing View From Junction of Gettysburg and Bradford Avenues Looking Towards Proposed Project Site

SOURCE: AFC Figure 8.11-5

VISUAL RESOURCES - FIGURE 10

Eastshore Energy Center - Landscape Character Photo from Heald College Towards Project Site

SOURCE: Photo taken by CEC staff January 2007

VISUAL RESOURCES - FIGURE 11

Eastshore Energy Center - Landscape Character Photo from 2nd Story of Building “W” Waterford Apartments

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Photo taken by applicant February 2007

VISUAL RESOURCES - FIGURE 12

Eastshore Energy Center - KOP 2 - Existing View from the West Entrance of the Life Chiropractic College West

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 13

Eastshore Energy Center - Bird's Eye View Photo That Represents the Existing View of the Project Site

SOURCE: AFC Figure 8.11-4A

VISUAL RESOURCES - FIGURE 14

Eastshore Energy Center - KOP 2 - Photo Simulation of the Proposed Project's Publicly Visible Structures

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 15

Eastshore Energy Center - Bird's Eye View of a Photo Simulation of the Proposed Project After Completion

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

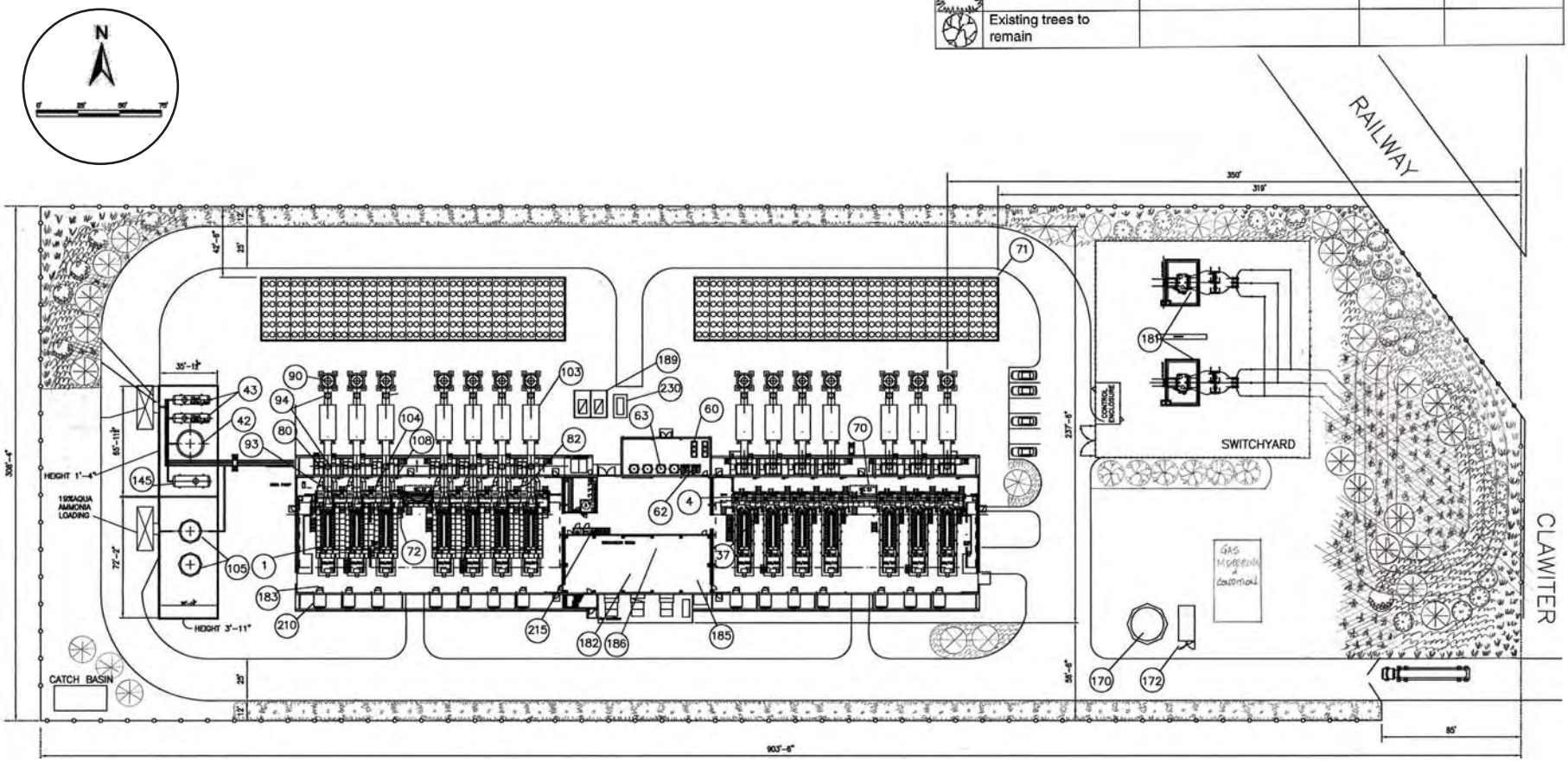
SOURCE: AFC Figure 8.11-4B

VISUAL RESOURCES - FIGURE 16

Eastshore Energy Center - Conceptual Landscape Plan

Species	Container Size	Height at Planting	Height at 5 years	Height at 10 Years	Notes
Redwood	15 gallon	7'	20'	40'	Maintains conical shape throughout life
Arbutus 'Marina"	5 gallon	6'	10'	25'	Initially much taller than wide, dense canopy fills out over time
Saucer Magnolia	15 gallon	4'	8'	15'	Open, rounded shape
Escallonia	1 gallon	1'	5'	12'	Assume is sheared to planter width, dense
Ceanothus 'Yankee Point'	1 gallon	6"	3'	3'	Sparce intitially, then covers ground completely with mounding shape
Matillija Poppy	1 gallon	1'	6'	6'	Stays tall and thin, but covers area
Agapanthus	1 gallon	3'	3'	3'	Will fill in to be solid mass
Wildflowers	Seed	0'	1'-2'	1'-2'	Depict as colorful masses at the base of the matillija poppies

	Common Name	Botanical Name	Quantity	Size
	Redwood	Sequoia sempervirens	33	15 gallon
	No common name	Arbutus andrachne 'Marina'	12	5 gallon
	Saucer Magnolia	Magnolia soulangeana	20	15 gallon
	California lilac	Ceanothus griseus horizontalis 'Yankee Point'	300	1 gallon
	Agapanthus - white	Agapanthus orientalis 'Albus	150	5 gallom
	Matillija Poppy	Romneya coulteri	200	1 gallon
	Native wildflower mix	Mixed for site	TBD	Seed
	Escallonia	Escallonia rubra	74	1 gallon
	Existing trees to remain			



SOURCE: AFC-Supplement Data, May 4, 2007

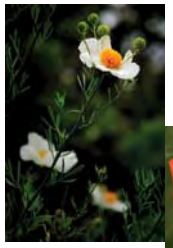
VISUAL RESOURCES - FIGURE 17

Eastshore Energy Center - Landscape Plan Plant Palette

Arbutus 'marina'

Escallonia

Ceanothus 'yankee point



Matillija Poppy

California Poppy

Wildflower mix

Agapanthus

Saucer Magnolia

Photo Courtesy of National Park Service

Photo Courtesy of Edward Z. Yang

Redwood

Plant Notes:

Arbutus Marina: Evergreen tree; to 40', usually less
Escallonia: Evergreen shrub; fast growing, upright, compact 6'-15' tall and wide but can be sheared; blooms intermittently all year
Ceanothus 'Yankee Point': Evergreen groundcover; 2'-3' tall x 8'-10' wide
Matillija Poppy: Perennial, dies back in late fall; 6'-8' tall x 2'- 3' wide
Wildflower mix: Annuals and perennials mixed for site; sow in fall
Agapanthus: Evergreen perennial; 3'x3' blooms white in early summer
Saucer Magnolia: Deciduous small tree; up to 25' x 25' soft leaves, pink flowers in late winter and early spring before and during leafing
Redwood: Evergreen conical large tree; fast growth in early years (3'-5' per year), 70' – 90' tall x 15' – 30' wide in 25 years.

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 18

Eastshore Energy Center - KOP 3 - Existing View of the Proposed Project Site from Clawiter Road

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 19

Eastshore Energy Center - KOP 3 - Photo Simulation of the Proposed Project's Publicly Visible Structures

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITY SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 20

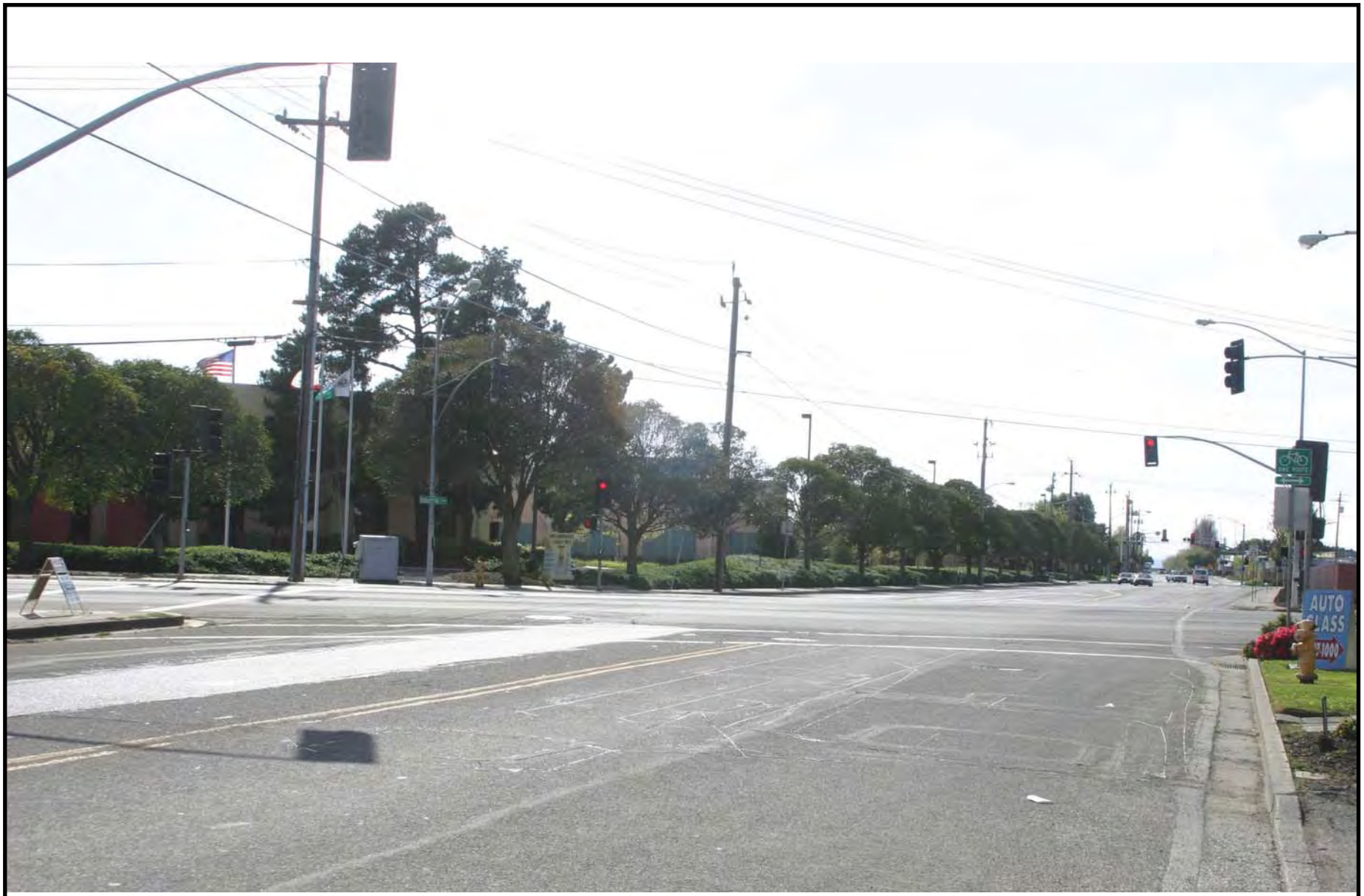
Eastshore Energy Center - KOP 3 - Photo Simulation of Landscape Growth Estimated at 5 Years

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITY SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 21

Eastshore Energy Center - KOP 4 - Existing View Towards Project Site from a Residence on Depot Road Near Industrial Boulevard



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 22

Eastshore Energy Center - KOP 5 - Existing View Towards Project Site from a Residence on Depot Road at Monte Vista Drive

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC-Supplement Data, May 4, 2007

VISUAL RESOURCES - FIGURE 23

Eastshore Energy Center - View of Fremont Bank Operations Center South of Project Site

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: Photo taken by CEC staff January 2007

VISUAL RESOURCES - FIGURE 24

Eastshore Energy Center - Landscape Character Photo - Enterprise Avenue West of Clawiter Road, Looking Towards Berkeley Farms Facilitiy

SOURCE: Photo taken by applicant

VISUAL RESOURCES - FIGURE 25

Eastshore Energy Center - Landscape Character Photo - Clawiter Road Near Enterprise Avenue Looking Towards Gillig Corporation

SOURCE: Photo taken by applicant

VISUAL RESOURCES - FIGURE 26

Eastshore Energy Center - Landscape Photo Near Junction of Fletcher Lane and Walper Street (3 miles from project site)

SOURCE: Photo taken by CEC staff August 2001

WASTE MANAGEMENT

Testimony of Suzanne Phinney, D.Env.

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the Eastshore project or the waste associated with remediation of existing on-site contamination would not result in any significant adverse environmental impacts if the measures and remediation proposed in the Application for Certification (AFC) and staff proposed conditions of certification are implemented.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Eastshore project and any hazardous wastes already existing on site because of past activities. Staff has 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 non-hazardous wastes. Staff has also evaluated the potential for site remediation. The technical scope of this analysis encompasses solid wastes existing on site, and those generated during facility construction and operation. Wastewater and contaminated groundwater issues are more fully discussed in the **Soil and Water Resources** section of this document.

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

- The management of wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner;
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities;
- Upon project completion, the site is managed such that contaminants would not pose a significant risk to humans or to the environment.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following framework of federal, state, and local environmental LORS exists to ensure the safe and proper management of hazardous wastes from generation to disposal in order to reduce the risks of accidents that might impact worker and public health and the environment. Absent unusual circumstances, staff finds that compliance with these comprehensive regulatory programs is sufficient to ensure that no adverse impacts associated with waste management will occur.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (C.F.R.) § 68.110 et seq. Superfund Amendments and Reauthorization Act of 1986 (SARA)	SARA Title III and the Clean Air Act of 1990 established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. This law requires 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 through preparation of Risk Management Plans. The requirements of this law are reflected in the California Health and Safety Code, Section 25531 et seq.
42 U.S.C. § 6922 Resource Conservation and Recovery Act (RCRA)	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 U.S. Environmental Protection Agency (US EPA) or authorized state agency.
Title 40, C. F. R., 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 law 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 (CalEPA), 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 create a manifest system to be used when transporting such wastes.
Title 27, California Code of Regulations, §15100 et seq. (Unified Hazardous Waste and Hazardous Materials Management Regulatory Program)	CalEPA has established a unified hazardous waste and hazardous materials management regulatory program (Unified Program) as required by statute (Health and Safety Code Chapter 6.11). The Unified Program consolidates, coordinates, and makes consistent portions of the following six existing programs: • Hazardous Waste Generators and Hazardous Waste On site Treatment; • Underground Storage Tanks; • Hazardous Material Release Response Plans and Inventories; • California Accidental Release Prevention Program; • Aboveground Storage Tanks (spill control and countermeasure plan only); • Uniform Fire Code Hazardous Material Management Plans and Inventories;

	The statute requires all counties to apply to the CalEPA Secretary for the certification of a local unified program agency.
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 and the California Integrated Waste Management Board, 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 US 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 and are enforced by the Department of Toxic Substances Control (DTSC).
Title 22, California Code of Regulations, §67100.1 et seq.	Hazardous Waste Source Reduction and Management Review. These sections establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate a generator's waste management plans and performance over the reporting period.
Title 8 California Code of Regulations §1529 and §5208	These are regulations requiring the proper removal of asbestos-containing materials and are enforced by California Occupational Safety and Health Administration (Cal OSHA).
Local	
City of Hayward General Plan	Section 8 of the General Plan identifies the Department of Public Works as the responsible entity for administering solid waste management rules.
City of Hayward, Municipal Code, Chapter 3, Article 8	Requires entities that store or handle hazardous materials or wastes to apply for a hazardous materials storage permit through submittal of a Hazardous Materials Business Plan.
City of Hayward Fire Department, Hazardous Materials Office	Certified by the state to implement the unified hazardous materials and hazardous waste management program in its jurisdiction.
County of Alameda, General Ordinance Code, Title 6, Chapter 6.76	Addresses enforcement of the California Integrated Waste Management Act of 1989, at the county level.
Bay Area Air Quality Management District (BAAQMD), Regulation 11-2-401.3	Requires that for every renovation involving the removal of 100 square ft/linear ft. or greater of Regulated Asbestos Containing Material, and for every demolition (even when no asbestos is present), a notification must be made to the BAAQMD at least 10 working days (except in special circumstances) prior to commencement of demolition or renovation. Outlines regulations for removing any Regulated Asbestos Containing Material.

SETTING

The proposed Eastshore project would be located at 25101 Clawiter Road on a 6.22-acre parcel, in the City of Hayward, Alameda County, California. The project site is the location of the former Trend Metal Finishing Facility. The project would involve demolishing an unoccupied 100,000-square-foot building, grading the site, and installing new foundations, piping, and utility connections (EEC 2006a, Section 8.13.1).

Both hazardous and non-hazardous wastes would be generated during site preparation, construction, and operations. The site is in an industrial location, and several industrial operations have operated on the site since the 1960s (EEC 2006a, Section 8.13.3).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are addressed in this **Waste Management** section: potential site contamination and the methods used to handle wastes (Class I hazardous wastes, Class II designated wastes, and Class III municipal solid wastes) during construction and operation. The methods staff uses and the thresholds for determining the significance of impacts are different for these two issues.

For any site proposed for the construction of a power plant in California, the applicant must provide sufficient documentation of the nature of any contamination on the site. Staff requires that, at the least, a Phase I Environmental Site Assessment (ESA) be prepared and submitted to the Energy Commission for staff's review and evaluation. A Phase I ESA provides a history of the use of the site, often as far back as the mid-1800s, in addition to a list of any hazardous waste release(s) within a certain distance of the site. If there is a reasonable potential that the site contains hazardous waste, soil or groundwater would be sampled and analyzed as part of a Phase II ESA.

Staff may utilize either or both of two approaches for determining if hazardous waste present on the site would pose a risk to either on-site workers (construction or operations), or to the public. The first approach follows standards promulgated by Cal EPA, principally by the Department of Toxic Substances Control (DTSC), the Office of Environmental Health Hazard Assessment (OEHHA), and the Regional Water Quality Control Boards (RWQCB). Staff would compare the levels of contaminants found on site with established standards, such as OEHHA California Human Health Screening Levels (CHHSLs). If metals are suspected at unsafe levels, staff would compare those levels to levels that occur naturally in soil or water, as tabulated by DTSC or other federal agencies, to determine if the levels are higher than background levels.

The second approach involves the preparation of a site-specific Human Health Risk Assessment and/or the Ecological Risk Assessment. The human health risk assessment would follow Cal EPA guidelines and address all affected populations, including the most burdened and compromised receptors. Staff would require the applicant to prepare an assessment and additionally require some form of remediation if the human health cancer risk exceeded one-in-one million or the non-cancer hazard index exceeded 1.0, per 42 U.S.C. Section 6922 (Resource Conservation and Recovery

Act), and California Health and Safety Code Section 25100 et seq. (Hazardous Waste Control Act of 1972, as amended). An ecological risk- screening evaluation or risk assessment would be required if contaminants could pose a risk to biological receptors. The applicant would also follow Cal EPA and RWQCB guidelines and, if the ecological risks are significant, appropriate mitigation could be required.

Regarding the management of wastes, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods meet state standards for waste reduction and recycling. Staff then reviews the available off-site treatment and disposal sites and determines whether the proposed power plant's waste would have a significant impact on the disposal sites' allotted daily, yearly, or lifetime volume of waste it is allowed to receive. Staff uses a threshold of less than 10 percent volumetric impact on a waste disposal facility to determine if the impact would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Contamination

Since the early 1960s, until 2005, the proposed project site housed two manufacturing facilities. Metal finishing occurred on the site from 1998 to 2005, at which point Trend Metal Finishing discontinued its operations. Sunoco, a manufacturer of epoxy-coated tubing, occupied the site from the early 1960s to 1998. In the late 1980s, Sunoco added an additional 41,000 square feet to the original 61,000-square-foot building on the site (EEC 2006a, Section 8.13.3).

Due to the age of the building and the type of operations performed, the potential exists for the presence of asbestos and lead-based paint materials, and for soil contamination in and around the building. A Phase I ESA was conducted in October 2005 to address these issues. The Phase I surveys indicated the potential for contamination from equipment pits and a wastewater treatment area. Asbestos-containing materials (ACM) were not observed, although previous inspections in both 1997 and 2000 indicated the potential for ACM. The Phase I ESA recommended that the potential asbestos and lead-based materials be further surveyed, and that soil samples be taken in areas where contamination could have occurred (EEC 2006a, Appendix 8.13A).

In May 2006, a limited subsurface investigation was undertaken at the former Trend Technology property. Subsurface investigations detected low levels of petroleum hydrocarbons, volatile organic compounds (VOCs), and pesticides in soil. Levels were generally highest nearest the surface and declined quickly with depth (EEC 2006a, Appendix 8.13B). Concentrations were generally below level at which regulatory agencies require clean-up. Concentrations of metals were consistent with typical background levels. No polychlorinated biphenyls (PCBs) were detected in soil samples. The subsurface investigation report recommended that sampling be performed in certain locations during building demolition, and that surveys be conducted to determine if lead-based paint and/or asbestos-containing materials are present in the building.

The DTSC reviewed the Eastshore project's AFC and provided the Energy Commission with a memorandum recommending that samples be taken at the project site (DTSC 2006). Staff incorporated DTSC's recommendations into the condition of certification

Waste-6 to ensure that the site is adequately characterized and remediated so that any workers, the public, and ecological receptors are not exposed to significant risks. As noted above, both the Phase I ESA and subsurface investigation recommended that additional sampling be conducted.

As both the property owner and the entity carrying out the demolition, the applicant will be responsible for removing any asbestos or hazardous waste, and for sampling soil and remediating any potential contamination. To ensure that contamination is properly identified and remediated, condition of certification **Waste-1** requires that an experienced Registered Professional Engineer or Geologist approved by the Energy Commission be available for consultation. Condition of certification **Waste-2** sets forth the requirements that the Registered Profession Engineer or Geologist must follow to ensure proper notification and remediation. The project owner cannot begin construction before verifying that the project site has been properly remediated.

Construction Impacts and Mitigation

Prior to demolition of the 100,000-square-foot building, the project must notify the Bay Area Air Quality Management District (BAAQMD) and determine if asbestos is present at the site. If asbestos is found, the project must meet the conditions in BAAQMD Regulation II Rule 2, which requires that proper removal and disposal practices be followed (see condition of certification **Waste-7**.

Site preparation and construction of the proposed generating plant and its associated facilities would last approximately 18 months and generate both non-hazardous and hazardous wastes in solid and liquid forms (EEC 2006a, Section 8.13.4.1). Before construction can begin, the project owner will be required to develop and implement a construction waste management plan as described in the proposed condition of certification **Waste-5**. This plan must describe all waste streams and methods of managing each waste.

Construction non-hazardous waste would consist of scrap wood, glass, plastic, paper, packing materials, waste lumber, and empty non-hazardous chemical containers. Non-hazardous waste oil filters would also be generated. Non-hazardous demolition materials would include concrete, wood, scrap metal, and excavation from existing structures. Approximately 10,000 cubic yards of non-hazardous solid wastes would be generated during construction (EEC 2006a, Section 8.13.4). All non-hazardous wastes would be recycled to the greatest extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility (Class II or Class III), per Title 14, California Code of Regulations, Section 17200 et seq. (*Minimum Standards for Solid Waste Handling and Disposal*), or in clean fill sites.

Non-hazardous liquid wastes would be generated during construction, and are fully discussed in the **Soil and Water Resources** section of this document. Stormwater runoff would be managed in accordance with a Drainage, Erosion, and Sediment Control Plan that would be prepared for the project and approved prior to construction. Other wastewaters would be sampled to determine their disposal.

Hazardous wastes anticipated to be generated during construction primarily include flushing and cleaning fluids, welding materials, lube oil, paint, solvents, adhesives,

asbestos-containing materials, and lead-based paint. The quantities of flushing and cleaning fluids are estimated to be once or twice the internal volume of the pipes cleaned (EEC 2006a, Section 8.13.4.1.2). Approximately 20,000 gallons of hazardous waste would be generated from construction of the project.

The construction contractor is considered to be the generator of hazardous wastes at this site during construction. Hazardous waste would be collected in hazardous waste accumulation containers before daily removal to the construction contractor's 90-day hazardous waste storage area. The accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Table 8.13-2 and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by the proposed condition of certification **Waste-4** to notify the Compliance Project Manager (CPM) whenever the owner becomes aware of this action.

Operation Impacts and Mitigation

The proposed Eastshore project would generate both non-hazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan as required in the proposed condition of certification **Waste-5**.

Non-hazardous Solid Wastes

Non-hazardous solid wastes generated during project operations would consist of rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, refuse associated with small office operations, and other miscellaneous solid wastes (CH2MHill 2007e, Page 18). These waste materials would be stored in a two cubic yard dumpster that would be emptied once per week. Metal parts would be recycled, as required. The project would generate approximately 150 tons of non-hazardous solid waste per year.

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes generated during the project's operation are further discussed in the **Soil and Water Resources** section of this document. Stormwater runoff would be managed in accordance with a drainage, erosion and sediment control plan. General facility drainage would consist of area washdown, sample drains, equipment leakage and drainage from facility equipment areas, and would be discharged to the facility's discharge effluent collection tank. Wastewater from engine water washes would also be collected in the holding tank. Water from the plant wastewater collection system would be discharged to the City of Hayward's sewer connection unless the wastewater contains chemicals or otherwise does not meet discharge criteria, in which case it would be trucked off site for disposal at an approved wastewater disposal facility (EEC 2006a, Section 8.13.4.2.2).

Hazardous Wastes

The applicant is the generator of hazardous wastes at this site during operations; therefore a unique hazardous waste generator identification number would be required for the generation of hazardous waste, pursuant to the proposed condition of certification **Waste-3**. Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, lubrication oil filters, mineral oil from transformer maintenance, spent selective catalytic reduction (SCR), and oxidation catalysts, oily rags, oil sorbents, spent lead acid batteries, treated coolant water rust inhibitor, and washdown drainage. Chemical feed area drains would collect spillage, tank overflows, effluent from maintenance operations, and liquid from area washdowns. Table 8.13-4 of the AFC provides a list of wastes, the amounts expected to be generated, and their disposal methods.

The amount of hazardous wastes generated during the Eastshore project's operations would be minimal, and recycling methods would be used to the extent possible. The remaining hazardous waste would be temporarily stored on site, pursuant to the California Fire Code and Title 22, California Code of Regulations, Section 66262.10 et seq., and disposed of by licensed hazardous waste collection and disposal companies in accordance with all applicable regulations, pursuant to Title 22, California Code of Regulations, Section 66262.10 et seq. Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency for violation of requirements imposed by federal law, the project owner would be required by the proposed condition of certification **Waste-4** to notify the CPM whenever the owner becomes aware of this action. The Energy Commission retains enforcement authority for local and state requirements.

In Section 8.13.6 of the AFC, the applicant states that the handling and management of operational waste would follow the hierarchical approach of source reduction, recycling, treatment, and disposal. Staff concludes that the quantities of hazardous waste generated during operation would not significantly impact the treatment and disposal resources available in California.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

Non-hazardous waste disposal sites suitable for discarding project-related construction and operation wastes are identified in Section 8.13.4.2.1 of the AFC (EEC 2006a, Table 8.13-3). Non-hazardous solid waste would be collected by the City of Hayward for disposal at the Altamont landfill disposal facility. The Vasco Road landfill could serve as an alternative disposal site. As shown on Table 8.13-3, both landfills have significant remaining capacity and their estimated closure dates are 2025 and 2015, respectively.

The total amount of non-hazardous waste generated from project construction and operation is expected to contribute less than 1 percent of available landfill capacity. Disposal of the solid wastes generated by the Eastshore project would not significantly impact the capacity or remaining life of either of these facilities.

Hazardous Wastes

Section 8.13.5.2 of the AFC discusses California's three Class I landfills: Clean Harbor's Buttonwillow landfill in Kern County, and Westmoreland landfill in Imperial County; and Waste Management's Kettleman Hills landfill in Kings County. The Kettleman Hills facility also accepts Class I, II, and III waste. In total, there is a combined excess of 16 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with at least 20 years remaining in their operating lifetimes. In addition, the Kettleman Hills facility is in the process of permitting an additional 15 million cubic yards of disposal capacity, and the Buttonwillow facility is not expected to reach its capacity until 2035-2045 at its current disposal rate (EEC 2006a, Section 8.14.3.5.2).

Most of the hazardous waste generated by the Eastshore project would be generated during facility construction and start up, in the form of flushing and cleaning liquids. The SCR catalysts would require regeneration every three to five years, resulting in the generation of a total of 153 cubic yards of hazardous waste that could require disposal in a Class I facility if recycling or regeneration are not feasible. All hazardous wastes generated during both construction and operation would be transported off site to a permitted treatment, storage, or disposal (TSD) facility for appropriate disposition, preferably through recycling. The volume of hazardous waste from the Eastshore project requiring off-site disposal would be far less than staff's threshold of significance, which is10 percent of the existing combined capacity of the three Class I landfills, and would therefore not significantly impact either the capacity or remaining life of any of these facilities.

CUMULATIVE IMPACTS

There are three large projects, Eastshore, Russell City Energy Center (RCEC) and the Route 92/I-880 Interchange Reconstruction Project proposed to for construction in Alameda County. As proposed, the quantities of solid waste and hazardous wastes generated during construction and operation of the three projects would add to the total quantities of waste generated in the State of California. Both Eastshore and RCEC propose to use the same Class II and III landfills. Combined, the Altamont and Vasco Road landfills have 155,742,205 cubic yards of capacity remaining. During construction of the power plant projects, the proposed projects will generate less than 12,000 cubic yards of nonhazardous waste. Staff does not have an estimate on how much waste the Route 92 project would generate. Recycling efforts would be prioritized wherever practical in conformance with Title 14, California Code of Regulations, and capacity is available in a variety of treatment and disposal facilities. Due to the minor amounts of wastes generated during project construction and operation, the insignificant impacts on individual disposal facilities and the availability of additional regional landfills, cumulative impacts would be insignificant for both hazardous and nonhazardous waste disposal.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the Eastshore project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility construction and operation. The applicant is required to dispose of hazardous and non-hazardous waste at facilities approved by the various departments within Cal EPA. The construction contractor would be responsible for hazardous waste

generated during construction. Because hazardous wastes would also be produced during project operation, the project would be required to obtain a hazardous waste generator identification number from DTSC. Accordingly, the Eastshore project would be required to properly store, package, and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees. Pursuant to California Code of Regulations, Title 22, Section 67100.1 et seq., a Hazardous Waste Source Reduction and Evaluation Review and Plan must be prepared by the applicant.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received comments relating to waste management from the City of Hayward (COH 2006b, 2007a) and the DTSC (DTSC 2006a). The City of Hayward expressed concern that the Phase I ESA lacked the professional's stamp and did not identify groundwater contamination in the area. Staff is in receipt of a revised copy of the Phase I ESA signature page bearing the professional engineer stamp for the responsible author ((CH2MHill 2007e, Attachment WM-75). Groundwater conditions are discussed in the **Soil and Water Resources** section of this document. The City also requested that the Energy Commission's staff assessment identify the state agency that would review soil and groundwater contamination at the site. The City of Hayward Fire Department would be the administering agency reviewing contamination issues.

The DTSC recommended that sampling be performed before development to ensure that no contamination exists which could affect nearby properties or impact long-term use of the property. Sampling requirements are included in staff's proposed condition of certification **Waste-6**. Should contamination be encountered and remedial activities undertaken, DTSC notes that the following assessments may be necessary: air and health impacts from excavation; exceedance of local air standards for dust and noise from excavation; transportation impacts from removal of contaminated soil; and risk of upset from an accident at the site.

CONCLUSIONS

Staff believes that management of the wastes generated during construction and operation of the Eastshore project would not result in any significant adverse impacts and would comply with LORS if the waste management measures proposed in both the AFC and staff's proposed conditions of certification are implemented.

Staff has proposed Conditions of Certification **Waste-1** through **7** which require:

1. The project owner has an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered;

2. if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or geologist shall inspect the site, determine the need for sampling, file a written report, and seek guidance from both the Compliance Project Manager (CPM) and the appropriate regulatory agencies;

3. the project owner shall obtain a hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority;

4. the project owner shall notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action;

5. the project owner shall prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM;

6. the project owner shall ensure that the site is properly characterized and remediated; and

7. the project owner shall conduct an asbestos survey and, if asbestos is present in building materials, shall follow proper notification, removal, and disposal procedures.

With staff's proposed mitigation, potential waste management impacts have been reduced to less than significant for all people within the affected area, including the minority population.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who will be available for consultation during soil excavation and grading activities, to the CPM for review and approval. The resume shall demonstrate experience in remedial investigation and feasibility studies.

The registered professional engineer or geologist shall be given full authority by the project owner to oversee any earth-moving activities that could disturb contaminated soil.

Verification: At least 30 days before the start of site mobilization, the project owner shall submit the resume of the Registered Professional Engineer or Geologist to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or at linear facilities, as indicated by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and to the CPM stating his or her recommended course of action.

Depending upon the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact

representatives of the City of Hayward Fire Department and the CPM for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste during operations.

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

WASTE-4 Upon learning of any impending waste management-related enforcement action by any local, state, or federal authority for violation of requirements imposed by federal law, the project owner shall notify the CPM of any action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM, in writing within 10 days of learning of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required to the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare both a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including temporary on-site storage, treatment methods, and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No fewer than 30 days before the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM for approval.

The Operation Waste Management Plan shall be submitted to the CPM no fewer than 30 days before the start of project operation for approval. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the annual compliance reports, the project owner shall document the actual waste management methods used during the year and provide a comparison of the actual methods used with those proposed in the original Operation Waste Management Plan.

WASTE-6 The project owner shall ensure that the site is properly characterized and remediated. The project owner shall ensure that a clean-up plan or soil management plan is developed describing the number and location of samples of soil, soil gas, and groundwater to be obtained and analyzed, and soil removal and disposal plans. The project owner shall assure this plan is submitted to the City of Hayward Fire Department for review and comment, and to the CPM for review and approval. Sampling related to the potential migration of chemicals from within the building shall be conducted at the time the building is demolished and concrete flooring removed. If contaminated soil is found, the project owner shall contact the City of Hayward Fire Department and the CPM for further guidance and possible oversight. In no event shall any project construction commence that involves either the movement of contaminated soil or construction on contaminated soil until the CPM has determined that all necessary remediation has been accomplished.

Verification: Following demolition and at least 30 days before the start of construction, the project owner shall provide documentation that the site has been appropriately characterized and remediated to the CPM for review and approval. The project owner shall provide a copy of all correspondence with the City of Hayward Fire Department to the CPM within 10 days of its receipt. In the event that certain specific site activities need to start before full characterization and remediation, the project owner shall request review and approval from the CPM.

WASTE-7 Before demolition of the building, the project owner shall conduct an asbestos survey to determine if lead-based paint and/or asbestos-containing material are present in the building. The project owner shall remove any such materials, and any other regulation building materials such as lead-based-paints, following the proper removal and disposal practices defined in the BAAQMD Regulation 11-2 procedures.

Verification: At least 60 days before the start of site mobilization, the project applicant shall provide any results submitted to the BAAQMD to the CPM for review and comment.

REFERENCES

CH2MHill 2007e – CH2MHill/ D. Stein (tn 39869) Eastshore Energy Data Responses, Set 3. 04/03/2007 Rec'd 04/03/2007.

COH 2006b – City of Hayward/ L. Arfsten (tn 38229) City of Hayward Fire Chief Larry Arfsten comments and questions on the Eastshore AFC. 10/20/2006 rec'd 10/23/2006.

COH 2007a – City of Hayward/ Jesus Armas (tn 38929) Letter from Jesus Armas regarding items for discussion with City of Hayward staff. 01/12/2007 Rec'd 01/16/2007.

DTSC 2006a – Department of Toxic Substance Control/ K. Toth (tn 38519) Letter: comments on Eastshore existing site buildings and foundations-- asbestos and lead-based paint. 11/282006 rec'd 12/01/2006.

EEC 2006a – Eastshore Energy Center, LLC/ G. Trewitt (tn 37923) Application for certification for the Eastshore Energy Center. 09/15/2006 rec'd 09/22/2006.

WORKER SAFETY AND FIRE PROTECTION

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

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Eastshore project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY -1, -2, -3, -4, -5,** and **-6**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

The proposed facility would be located within an industrial area that is currently served by the local fire department and in which two power plants are proposed to be built and operated. Staff concluded in the Preliminary Staff Assessment (PSA), based on a preliminary recommendation of the Hayward Fire Department (HFD) as a response to a public comment, that the emergency response needs of the two power plants cumulatively posed significant added demands on local fire protection services, specifically on response time. Staff had therefore preliminarily proposed a condition of certification that would provide funds to enhance the fire department's ability to respond to an emergency at this project, the Russell City Project, and other industries in the area. However, despite numerous requests by staff for the Hayward Fire Department (HFD) to provide comments on the proposed Eastshore project, its assessment of the project regarding fire, hazardous materials issues, and emergency medical services issues, a description of any impact the Eastshore project would have on the Department's ability to provide emergency response services, and the basis for any mitigation suggested by the HFD, the only comment provided by the City of Hayward consisted of the cost of the suggested upgrades to the Opticom system that allows the fire department to control traffic signals. No other comments have been provided and no justification or "needs assessment" has been provided by the HFD. Absent such documentation, staff has no choice but to remove its preliminary proposal for a condition of certification because CEQA does not provide authority for the Lead Agency to require mitigation when no impacts can be defined, identified, and documented.

INTRODUCTION

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

The purpose of this Final Staff Assessment (FSA) is to assess the worker safety and fire protection measures proposed by the Eastshore project and to determine whether the applicant has proposed adequate measures to:

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

LAWS, ORDINANCES, REGULATION, AND STANDARDS

WORKER SAFETY AND FIRE PROTECTION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq. .	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies.

Emergency Response Plan	Allows response agency to integrate Eastshore emergency response activities into any response actions.
Business Plan	Provides response agency with overview of Eastshore purpose and operations.
Risk Management Plan	Provides response agency with detailed review of risks and hazards located at Eastshore and mitigation implemented to control risks or hazards.
2001 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	National Fire Protection Association (NFPA) standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-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 incorporates current editions of the UFC standards. The City of Hayward adopted the 2001 California Fire Code (CFC) into its municipal code and is the administering agency for the CFC standards.
California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.)	Comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The California Building Standards Code incorporates current editions of the Uniform Building Code and includes the electrical, mechanical, energy, and fire codes applicable to the project. The Uniform Building Code, the 2001 California Building Standards Code, and the City of Hayward Building Code are enforced by the City Community and Economic Development Department.
Uniform Fire Code, 1997	Contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

SETTING

Fire support services to the site will be under the jurisdiction of the Hayward Fire Department (HFD). Fire Station No. 6, located at 1401 West Winton Avenue, is the nearest station to Eastshore. Station No. 6 has one fire engine and three fire fighters (Berg 2007a). The nearest station that would come to the aid of Station No. 6 would be Stations No. 1 (22690 Main Street), Station No. 2 (360 West Harder Road), and Station No. 4 (27826 Loyola Avenue). Combined, these three stations have four engines and one truck with 16 firefighters including a battalion chief. Station No. 6 would respond to a call from the site in approximately 3 to 4 minutes (Berg 2007a).

In Hayward, hazardous materials permits and spills are handled and investigated by the HFD. Because there is not one specific hazardous material team, the nearest fire station will respond to hazardous material emergencies. According to Hayward Fire Marshal John Berg, all fire station personnel are trained to HazMat First Responder Operational level and thus the fire department is able to respond to incidents involving hazardous materials spills, including aqueous ammonia. The HFD response time to a hazmat emergency at Eastshore is approximately 3 to 4 minutes (Berg 2007a).

WORKER SAFETY AND FIRE PROTECTION Table 1
Equipment and Personnel at HFD*

HFD Station	Response Time**	Distance to EEC	Equipment	#of Firefighters per shift	EMS/HazMat Capability***
Station #6	3 to 4 min.	1.1 mi	1 fire engine	3	Y/Y
Station #1	10 to 13 min.	3.9 mi	1 Battalion Chief 1 fire engine 1 fire truck	7	Y/Y
Station #2	9 to 12 min.	3 mi	1 fire engine	3	Y/Y
Station #4	6 to 8 min.	2.2 mi	1 fire engine	3	Y/Y

*Source: Information received by email from Hayward Fire Marshall John Berg 5/18/07
**estimated response times are dependent upon traffic conditions, railroad delays, and other variables.
***all personnel are trained to EMT-1 level and at least one paramedic per apparatus.

In addition to construction and operations worker safety issues, this site has soil and groundwater contamination. The contamination includes metals, organics, and residual petroleum products. The staff assessment section on **WASTE MANAGEMENT** discusses this issue in great detail. Proposed conditions of certification **Waste-6** and **Waste-7** would require that the site is adequately characterized, a human health risk assessment is prepared, and the site is remediated and managed such that any residual contamination would pose an insignificant risk to the on-site construction and operations workers, the off-site public, and to ecological receptors.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by Cal-OSHA regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal-OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities in each area, the response time, and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to

respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed Eastshore project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the Eastshore 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.

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

Eastshore encompasses construction and operation of a natural gas fired-facility. Workers will be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility.

Construction Safety Orders are published at 8 CCR sections 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509)
- Construction Fire Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will include:

- Electrical Safety Program;
- Motor Vehicle and Heavy Equipment Safety Program;
- Forklift Operation Program;

- Excavation/Trenching Program;
- Fall Protection Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Heat and Cold Stress Monitoring and Control Program;
- Pressure Vessel and Pipeline Safety Program;
- Hazardous Waste Program;
- Hot Work Safety Program;
- Permit-Required Confined Space Entry Program; and
- Demolition Procedure (if applicable).

The Application for Certification (AFC) includes adequate outlines of each of the above programs (EEC 2006a, Section 8.7.4.3.1). Prior to the start of construction of Eastshore, detailed programs and plans will be provided pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at Eastshore, 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);
- Fire Prevention Program (8 CCR § 3221);
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411); and
- Emergency Action Plan (8 CCR § 3220).

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

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (EEC 2006a, Section 8.7.4.3.2). Prior to operation of Eastshore, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

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

Injury and Illness Prevention Program (IIPP)

The IIPP will include the following components as presented in the AFC (EEC 2006a, Section 8.7.4.3.2):

- identity of person(s) with authority and responsibility for implementing the program;
- establish safety and health policy of the plan;
- define work rules and safe work practices for construction activities;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- determine and establish training and instruction requirements and programs;
- specify safety procedures; and
- training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (EEC 2006a 8.7.4.3.2). The plan will include the following topics:

- determine general program requirements;
- determine fire hazard inventory, including ignition sources and mitigation;
- develop good housekeeping practices and proper materials storage;
- establish employee alarm and/or communication system(s);
- provide portable fire extinguishers at appropriate site locations;
- locate fixed fire fighting equipment in suitable areas;
- specify fire control requirements and procedures;

- establish proper flammable and combustible liquid storage facilities;
- identify the location and use of flammable and combustible liquids;
- provide proper dispensing and determine disposal requirements for flammable liquids;
- establish and determine training and instruction requirements and programs; and
- identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) for review and approval and to the HFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

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

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

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

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). . The AFC contains a satisfactory outline for an emergency action plan (EEC 2006a Section 8.7.4.3.2).

The outline lists the following features:

- establish emergency escape procedures and emergency escape route for the facility;
- determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;

- provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specify rescue and medical duties for assigned employees;
- identify fire and emergency reporting procedures to regulatory agencies;
- develop alarm and communication system for the facility;
- establish a list of personnel to contact for information on the plan contents;
- provide emergency response procedures for ammonia release; and
- determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS apply to the project, called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading Construction Safety and Health Program in this staff assessment.

In addition, the project owner would be required to provide personnel protective equipment and exposure monitoring for workers who are involved in activities on sites where contaminated soil and/or contaminated groundwater exist as per staff's proposed Conditions of Certification **WORKER SAFETY-1** and**-2**.

These proposed Conditions of Certification would ensure that workers are properly protected from any hazardous wastes presently at the site.

Safety Training Programs

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

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980-1993, an average of 1,079 construction workers were killed on the job each year, more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- 15% of workers' compensation costs are spent on construction injuries.

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

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large complex industrial type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. This has been evident in the audits of power plants under construction recently conducted by the staff. The Federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize those subcontractors with exemplary safety and health programs.

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

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

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission

staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

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

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

Fire Hazards

During construction and operation of the proposed Eastshore project there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the City of Hayward Fire Department to determine if available fire protection services and

equipment would adequately protect workers, and to determine the project's impact on fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the HFD (Berg 2007a).

Construction

During construction, portable fire extinguishers will be located throughout the site and maintained, and safety procedures and training will be implemented (CH2MHill 2007a, Data Response Workshop 1A, page 52). . In addition, the applicant agrees to notify the HFD of any fire incident during construction (Personal Communication from HFD Fire Chief Larry Arfsten, Data Response Workshop 1A, January 2007). . Station No. 6 of the HFD will provide fire protection backup for larger fires that cannot be extinguished using the portable suppression equipment (CH2MHill 2007a, Data Response Workshop 1A, page 53).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire extinguishing systems. The fire water will be supplied via a new site service line, which will be extended from an existing main line service connection on the plant side of Clawiter Road. This connection will be sized in accordance with National Fire Protection Association (NFPA) guidelines to provide protection from the onsite worst-case single fire (EEC 2006a, Section 2.2.12).

A wet pipe sprinkler fire protection system will be provided for the combustion turbine generators and accessory equipment. The system will have fire detection sensors and gas sensors that will trigger alarms, turn off ventilation, close ventilation openings, and automatically actuate the sprinkler system. For those systems where the use of fire sprinklers is not recommended, an FM-200 or comparable fire protection system will be employed. . Fire detection sensors will release the active fire suppression agent and deactivate equipment controlled by any device or power plant system engulfed in a fire. A fire wall will be installed to separate the two 60 percent main switchyard transformers (GSUs) (EEC 2006a, Section 2.3.2.1.1).

In addition to the fixed fire protection system, smoke detectors, flame detectors, temperature detectors, and appropriate class of service portable extinguishers and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirement by the NFPA and the UFC and staff has determined that they will ensure adequate fire protection.

The applicant would be required by **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the HFD prior to construction and

operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

A state-wide survey was conducted by staff to determine the frequency of Emergency Medical Services (EMS) response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work related incidences, including visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site defibrillator; the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a devise on-site in order to convert cardiac arrythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional condition of certification **WORKER SAFETY-5** is proposed which would require that a portable automatic cardiac defibrillator be located on site, that all power plant employees on-site during operations be trained in its use, and that a representative number of workers on-site during construction and commissioning also be trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the Eastshore project combined with existing industrial facilities and expected new facilities, including the nearby Russell City Project (RCEC), to result in impacts on the fire and emergency service capabilities of the HFD. Based upon a preliminary opinion by the HFD in response to a question from the public, staff had preliminarily determined that the project's incremental effect would be cumulatively considerable and had urged the applicant to discuss mitigation with the HFD. As of the date of writing the Preliminary Staff Assessment, HFD Chief Larry Arfsten had indicated that his department was not yet sufficiently knowledgeable about the proposed project to fully discuss mitigation measures. As of the date of the FSA, this situation has apparently not changed and staff has not received any comment, analysis, or a "needs assessment" from the HFD. Earlier, in response to a request from intervener Mr. Paul Haavik, Fire Marshal John Berg had identified a mitigation measure that would address this project's contribution to the combined cumulative effect as preliminarily determined by the HFD. (See Response to Public and Agency Comments for a more detailed discussion of the request and response from the HFD and staff.) However, since no documentation was provided by

the HFD that an impact exists, staff cannot propose any mitigation in the form of a condition of certification.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Several written comments about the project before the issuance of the PSA were received on fire protection issues from the City of Hayward Fire Chief. Staff met with the Fire Chief on two separate occasions to discuss the Chief's concerns and the applicant has met with the Chief at least once. No other agency provided comments on worker safety or fire protection. According to HFD Chief Larry Arfsten, the applicant has provided adequate responses to some but not all of his comments but that the HFD and the applicant remain in contact to resolve the outstanding questions.

One comment from intervener Paul Haavik addressed the issue of hazardous material spill response time by the Hayward Fire Department. Mr. Haavik was concerned that an adequate response to a HazMat spill at the Eastshore facility would be delayed by the construction at Interstate 880 and State Route 92 that began in the summer of 2007 and will continue through the construction and early years of operations of the Eastshore project should it be licensed by the Commission. He proposed that the Eastshore project and the RCEC, along with a Berkeley Farms facility (which uses anhydrous ammonia), jointly fund a Hazardous Material Incidence Team (HIT) to be located west of I-880 to better respond to potential spills of ammonia and other hazardous materials at industries located west of I-880 and north of SR-92. In that manner, the construction and closure of off-ramps and streets due to the 880/92 construction would not impede response for either the HFD or the Alameda County Hazardous Material Incidence Team headquartered in Castro Valley (east of I-880).

Staff is aware of the highway construction planned for this area, as well as being aware of the traffic problems that exist in this part of the Bay Area. Staff feels that the HFD and the Alameda County HIT are more than capable of finding their way through traffic and around highway construction.

Staff discussed this issue of response time and the proposal of Mr. Haavik with Hayward Fire Marshall John Berg and Hayward Hazardous Materials Coordinator Hugh Murphy. The HFD is aware of the request by Mr. Haavik and stated that they will consider the need for a greater HazMat response presence on the west side of I-880. Fire Marshal Berg discussed this matter with the Alameda County HIT and with HFD Chief Arfsten and provided a preliminary evaluation and suggestion to staff. The HFD utilizes the "Opticom" system on its fire trucks that allows them to control traffic signals. Fire Marshal Berg explained that there is the need to improve the system since the first responder (Station 6 at 1401 W. Winton) might be occupied elsewhere when a calls comes in for response to the Eastshore project. This would require the next available fire station to respond and an improvement in the "Opticom" system would ensure a timely response from the other stations (Berg 2007b). Alameda County HIT could also use the HFD "Opticom" system if the system were to be improved. Fire Marshall Berg did not know the costs or feasibility of improvements at the time of writing the PSA but stated they would know prior to completing the FSA. Staff proposed a Condition of Certification in the PSA that required the project owner to negotiate providing this improvement and other appropriate mitigation.

Comments made on the PSA relative to Worker Safety or Fire Protection are generally responded to in the body of the text of this section and summarized below.

AGENCY COMMENTS ON THE PSA

The only agency comments received on the PSA specifically addressing Worker Safety or Fire Protection issues was from the City of Hayward Planning Manager describing the costs of the requested Opticom system. As described above, absent any discussion, comment, and documentation from the HFD, staff cannot support a requirement for the project owner to provide payment for this system. Staff reiterates its strong support for negotiations to take place between the applicant and the HFD to address this matter.

PUBLIC COMMENTS ON THE PSA

No comments were made at the workshop that specifically addressed worker safety or fire protection issues. However, one comment filed in writing to Energy Commission staff following the PSA workshop did address fire protection matters. The neighbor immediately to the south of the project fenceline, Fremont Bank, expressed concern about a fire or a natural gas explosion at the power plant impacting the building and bank personnel. Staff has addressed this issue in the FSA under the section headings **Fire Protection Plan** and **Fire Hazards**. Staff wishes to note that natural gas will not be stored on-site and should a gas leak occur, automatic and manual shut-off valves will limit the amount of fuel available to burn. Also, an explosion of natural gas is a very rare event. Staff believes that given the safety record of natural gas-fired power plants in California and the automatic shut-down, fire detection, and fire suppression systems that are required to be installed at this power plant, the risk of a fire or an explosion is below the level of significance and the risk of off-site impacts are also insignificant.

Fremont Bank also expressed concern over the lack of assurances from the HFD. Actually, the HFD has been largely silent and has neither expressed concern nor lack of concern about this project. In the absence of any concern about its ability to respond to any emergency (fire, hazmat, or medical) at the proposed power plant, staff is left to rely on its own professional judgment and considerable experience in deciding that resources are more than adequate to respond to any emergency at this power plant. Staff also relied on a state-wide study it conducted (referenced above) that concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments.

CONCLUSIONS

Staff concludes that if the applicant for the proposed Eastshore project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY -1**, and **-2**; and fulfils the requirements of **WORKER SAFETY-3** through**-6**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments.

PROPOSED CONDITIONS OF CERTIFICATION

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

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

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

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Hayward Fire Department stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

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

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Hayward Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Hayward Fire Department stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

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

- Have over-all authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in Worker Safety-1 and-2 are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in Worker Safety 3, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic cardiac defibrillator is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, a representative number of workers consistent with American Heart Association guidelines shall be trained in its use. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit to the CPM proof that a portable automatic cardiac defibrillator exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall immediately notify the Hayward Fire Department and the CPM of any incident involving fire, hazardous materials, or an Emergency Medical Service response, however small or short-lived, that occurs within the power plant site, as soon as power plant personnel become aware of the incident.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM a copy of the Policy and Procedures that direct all power plant personnel to immediately notify the Hayward Fire Department and the CPM when an incident occurs within the project site.

REFERENCES

Berg, John 2007a. Personal communication with City of Hayward Fire Marshall John Berg. May 18.

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

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Personal Communication from HFD Fire Chief Larry Arfsten, Data Response Workshop January 15, 2007.

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

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

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Steve Baker

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- Verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- Determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

SETTING

Eastshore Energy, LLC (Eastshore) proposes to construct and operate a nominally rated 115.5 megawatt (MW) peaking power plant known as the Eastshore Energy Center (EEC). The project will be located in the City of Hayward, Alameda County. The 6.22-acre industrial site lies within the City of Hayward and will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. References to "the City" and "the County" designate the City of Hayward and Alameda County, respectively. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices 10-A through 10-G (Eastshore 2006a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (Eastshore 2006a, § 10.5; Appendices 1C, 10-A through 10-G). Some of these LORS include the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM) and American Welding Society (AWS).

ANALYSIS

The basis of this analysis is the applicant's analysis, proposed construction methods, and the list of engineering 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 natural gas pipeline and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendices 10-A through 10-G for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would 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, that are used for the storage, containment, or handling of hazardous or toxic materials, or those that may become potential health and safety hazards if not constructed according to the applicable engineering LORS. 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 engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 2001 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction

of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be superseded by 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 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.

PROJECT QUALITY PROCEDURES

The AFC (Eastshore 2006a, § 2.4.5) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 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 to 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 delegates typically include the local building official and/or 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 or the County, or a third party engineering consultant, 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 delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall 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 subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse 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 subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities 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:

- 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 AGENCY AND PUBLIC COMMENTS

No comments were received from any agencies or members of the public.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the 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 engineering LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering 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. Staff will audit the CBO to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan 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 engineering LORS.

RECOMMENDATIONS

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 2001 CBSC (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. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans

are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) The project owner shall insure that all the provisions of the above applicable codes be enforced during any construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility [2001 CBC, Section 101.3, Scope]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

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

Verification: Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the 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 [2001 CBC, Section 109 – Certificate of Occupancy].

Once the Certificate of Occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility which may require CBO approval for the purpose of complying with the above stated codes. The CPM will then determine the necessity of CBO approval on the work to be performed.

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 project owner and CBO approved alternative timeframe) 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 **Facility Design 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

Equipment/System	Quantity (Plant)
Engine Genset w/ Auxiliary Module Foundation and Connections	14
Selective Catalytic Reduction Unit Foundation and Connections	14
Oxidation Catalyst Unit Foundation and Connections	14
Exhaust Stack Structure, Foundation and Connections	14
Closed-Loop Cooling System Structure, Foundation and Connections	2
Main Step-up Transformer Foundation and Connections	2
Auxiliary or Station Service Transformer Foundation and Connections	2
Fuel gas Heater Foundation and Connections	1
Fire Protection System	1
Raw Water Storage Tank Foundation and Connections	1
Aqueous Ammonia Storage Tank Foundation and Connections	2
Aqueous Ammonia Handling System Foundation and Connections	1
Waste Water Holding Tank Foundation and Connections	1
Clean Lube Oil Storage Tank Foundation and Connections	1
Dirty Lube Oil Storage Tank Foundation and Connections	1
Engine Hall, Warehouse/Shop, and Control Room Structure, Foundation and Connections	1
Start Air System	2
Instrument and Service Air System	1
Miscellaneous Ancillary Equipment	1 Lot
Black Start Emergency Diesel Generator Foundation and Connections	1
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
Plant Control System	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan 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 2001 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 Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided 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 project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-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; and B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: 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; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification 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, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [2001 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the Foundation Investigations Report, Geotechnical Report or Soils Report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design, or be responsible for 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

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the Foundation Investigations Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and

4. Recommend field changes to the civil engineer and RE.

   This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [2001 CBC, section 104.2.4, Stop orders].

C. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. 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 project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer and soils (geotechnical) engineer assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2001 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work

(requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification 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 [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; 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 (or project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [2001 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall 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. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project [2001 CBC, Section 106.4.2, Retention of Plans].

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils Report, Geotechnical Report or Foundation Investigations Report required by the 2001 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions.

The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [2001 CBC, Section 104.2.4, Stop orders].

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2001 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 [2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans [1998 CBC, Section 3318, Completion of Work].

Verification: Within 30 days (or project owner and CBO approved alternative timeframe) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any construction of any major structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above,

the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be submitted for the following items (from **Table 1**, above):

1. Major project structures;

2. Major foundations, equipment supports and anchorage; and

3. Large field fabricated tanks.

Construction of any structure or component shall not 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 [2001 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 prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [2001 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents];

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 [2001 CBC, Section 106.3.4, Architect or Engineer of Record]; and

   Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS [2001 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2** above,

the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next Monthly Compliance Report a copy of a statement from the CBO that the proposed structural plans, specifications and calculations have been approved and are in compliance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2001 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 and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. 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 2001 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 to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 2001 CBC shall, at a minimum, be designed to comply with the requirements of that Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable

laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2001 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 1**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by 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 [2001 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 project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of 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 [2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for 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 2001, 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 [2001 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:

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) 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

Eastshore 2006a. Eastshore Energy, LLC. Application for Certification for the Eastshore Energy Center. Volumes 1 and 2. Submitted to the California Energy Commission, September 22, 2006.

GEOLOGY AND PALEONTOLOGY

Testimony of Patrick Pilling, Ph.D., P.E., G.E.

SUMMARY OF CONCLUSIONS

With the exception of strong ground shaking, potential liquefaction during an earthquake, potential differential settlement of heavily loaded structures, and expansive clay soils, the Eastshore Energy Center (Eastshore) project site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. The effects of strong ground shaking, potential liquefaction, and potential differential settlement must be mitigated through structural design as required by the California Building Code (2001) and as recommended in the project geotechnical report (CH2MHill, 2007a). Expansive clay soils should be mitigated based on the recommendations in the project geotechnical report (CH2MHill, 2007a). The CBC (2001) requires that structures be designed to resist seismic stresses based on ground acceleration and, to a lesser extent, liquefaction potential. The design-level geotechnical investigation required for the project by the CBC, and Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** in the **Facility Design** section, will present standard engineering design recommendations for mitigation of liquefaction potential, excessive settlement and expansive clay soils.

There are no known viable geologic or mineralogic resources at the project site. Paleontological Resources have been documented in the general area of the project. The potential impacts to paleontological resources due to construction activities will be mitigated by worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to an impact that is less than significant, and the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, is low. It is Energy Commission staff's opinion that the Eastshore project can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS) and in a manner that protects environmental quality and assures public health and safety.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed Eastshore project regarding geologic hazards, geologic (including mineralogic) and paleontologic resources. 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. A brief geological and paleontological overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of proposed conditions of certification.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC), in Section 8.15.2, Table 8.15-1, Section 8.16.2, and Table 8.16-1 (EEC, 2006a). The following is a brief description of the current LORS for geologic hazards and resources, and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	The proposed Eastshore project is not located on federal land. There are no Federal LORS for geologic hazards and resources for this site.
State/Local	
California Building Standards Code (CBSC), 2001 [particularly Part 2, California Building Code (CBC)]	The CBC along with amendments by the City of Hayward includes a series of standards that are used in project investigation, design and construction (including design criteria for structures with respect to seismic design and load bearing capacity).
Alquist-Priolo Earthquake Fault Zoning Act and Seismic Hazards Mapping Act, California Code of Regulations Title 14, Division 2, Chapter 8	The Alquist-Priolo Earthquake Fault Zoning Act identifies areas subject to surface rupture from active earthquake faults. The Seismic Hazards Mapping Act identifies non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides.
Local	
City of Hayward General Plan	The City of Hayward General Plan includes standards which ensure compliance with the conservation and environmental protection elements of the plan.
Standard of Practice - Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.

SETTING

The proposed Eastshore site is a 6.22-acre parcel owned by Eastshore Energy LLC at 25101 Clawiter Road in the City of Hayward, Alameda County, California. The site area is zoned for industrial use and the site is currently occupied by a large industrial manufacturing building and associated asphalt pavement. The Eastshore site is bordered to the east by Clawiter Road, to the north by an existing railroad spur and industrial development, and to the west and south by industrial development.

The proposed project will be a nominal 115.5-megawatt net intermediate/peaking load facility operation up to 4,000 hours per year using natural gas-fired reciprocating engine

technology. Ancillary facilities include 1.1-miles of 115 kV single-circuit transmission line interconnecting to PG&E's Eastshore Substation and approximately 200 feet of natural gas pipeline connecting to PG&E's line 153.

REGIONAL SETTING

The project site is located on a gently sloping alluvial fan about 1.5 miles east of the southeastern shore of San Francisco Bay. It is centrally located with the Coast Ranges province, in west-central California. The San Francisco Bay fills a northwest trending structural depression in the central Coast Ranges, lying between the San Andreas Fault to the southwest and the Hayward Fault to the northwest. The project site is bounded on the east by the foothills of the Diablo Range, and on the west and southwest by the San Francisco Bay and the sloughs and tidal channels associated with the mouths of Alameda and Mt. Eden Creeks (EEC, 2006a).

The two major physiographic units in the immediate area of the project site include tidally influenced San Francisco Bay plain and the alluvial fans extending down from the highlands to the east (EEC, 2006a). The site itself is located on the toe of the Ward Creek alluvial fan.

PROJECT SITE DESCRIPTION

The project site is relatively level and consists of reclaimed tidal flats. The site is immediately underlain by artificial fill, younger bay mud (intertidal deposits), alluvial terrace deposits, basin deposits, floodplain deposits, and alluvial fan and fluvial deposits (EEC, 2006a). Graymer (2000) suggests the site surface deposits consist of Holocene age alluvial fan deposits, which include recent Bay muds and salt-marsh deposits.

The thickness of the artificial fill materials across the existing building footprint is estimated to be approximately 5 to 6.5 feet deep (CH2MHill, 2007a). This material was classified as medium dense to very dense clayey gravel. Although the artificial fill could contain fossils since it is typically comprised of sediments from older deposits, any such fossils would lack stratigraphic context such that they would only have very limited scientific and educational value.

The native materials that underlie the fill generally consist of clay soils with thin interbeds of granular materials (CH2MHill, 2007a). The clay soils are described as stiff to very stiff, and lean to fat clay. These materials exhibit consolidation potential when loaded, and are subject to substantial changes in volume with changes in moisture content. The interbeds of granular soils are generally present below a depth of 10 feet in 3 to 10-foot-thick layers. These soils have been classified as loose to medium dense.

With the exception of artificial fill, the materials that underlie the site have produced numerous significant plant, invertebrate, and vertebrate fossils at previously recorded fossil sites and, as a result, have a high potential for additional similar fossils to be uncovered by excavations for project construction that extend into native materials.

Ground water was measured at a depth of 12 feet below existing grade at the time of site exploration (CH2MHill, 2007a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS with respect to geologic hazards and geologic and mineralogic resources apply to this project; however, the CBSC and CBC (2001) provide geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility. Geologic hazards to be considered include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area have been reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. When available, operating procedures of the proposed facility, in particular ground water extraction and mass grading, are reviewed to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information provided by the applicant for the Eastshore project. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If such resources are present or likely to exist, conditions of certification are proposed for inclusion in the project approval, which outlines procedures required during construction to mitigate any impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Strong ground shaking, potential liquefaction during an earthquake, potential differential settlement of heavily loaded structures, and expansive clay soils represent the main

geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating the recommendations contained in the project geotechnical report (CH2MHill, 2007a). Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented within 1 mile of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high when native materials are encountered. This assessment is based on SVP criteria and the confidential paleontological report appended to the AFC (EEC, 2006a). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS).

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and to protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is very low.

GEOLOGICAL HAZARDS

The AFC (EEC, 2006a) and associated site-specific geotechnical report (CH2MHill, 2007a) provides documentation of potential geologic hazards at the Eastshore plant site, in addition to subsurface exploration information. Review of these documents, coupled with our independent research, indicates that potential for geologic hazards to impact the plant site is low.

Our independent research included review of available geologic maps, reports, and related data of the Eastshore plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), U.S. Geological Survey (USGS), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the CGS publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (CGS, 1994); the *Simplified Fault Activity Map of California* (Jennings and Saucedo, 2002), *Earthquake Probabilities in the San Francisco Bay Region: 2000 – 2031* (2003) *Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada*

(International Conference of Building Officials [ICBO], 1998), the *Quaternary Geologic Map of the San Francisco Bay* (Wahrhaftig et al., 1993); the *Geologic Map of the San Francisco-San Jose Quadrangle* (Wagner et al., 1990); *Seismic Shaking Hazard Maps of California* (Petersen et al., 1999); *Probabilistic Seismic Hazard Assessment for the State of California* (CDMG, 1996a); and *Peak Acceleration from Maximum Credible Earthquakes in California (Rock and Stiff Soil Sites)* (CDMG, 1992). No active or potentially active faults are known to cross the power plant footprint or its associated linear facilities. The project is located within seismic Zone 4 as delineated on Figure 16-2 of the 2001 edition of the CBC.

Under the CBC, a fault with a maximum moment magnitude greater than 7 and a slip rate in excess of 5 mm/year is classified a class “A” fault. The maximum moment magnitude earthquake is defined as the largest earthquake that a given fault is considered capable of generating. Three class A faults were identified within 32 kilometers of the Eastshore site. The closest is the Hayward Fault, which is located approximately 5.3 kilometers east of the project site. The maximum moment magnitude earthquake for the segment of the Hayward Fault closest to the project is a moment magnitude 7.3 event. The overall slip rate for the Hayward Fault ranges from approximately 3 mm/year to as much as 9 mm/year for an average of approximately 4.6 mm/year (Bryant et al., 2000). A mean peak horizontal bedrock acceleration for the Hayward fault is estimated to be 53.4 percent of the acceleration due to gravity (0.534g) (EEC, 2006a).

The San Andreas Fault is located approximately 24.2 kilometers west of the project site. The maximum moment magnitude earthquake for the segment of the San Andreas Fault closest to the project is a moment magnitude 7.9 event. The slip rate for this section of the San Andreas Fault is 24 mm/year (ICBO, 1998, Table 1). A mean peak horizontal bedrock acceleration for the San Andreas fault is estimated to be 0.278g (EEC, 2006a).

The Calaveras Fault is located approximately 17.7 kilometers east of the project site. The maximum moment magnitude earthquake for the segment of the Calaveras Fault closest to the project is a 6.8 moment magnitude event. The slip rate for this section of the Calaveras Fault is 5 to 6 mm/year (Bryant et al., 1999). A mean peak horizontal bedrock acceleration for the Calaveras fault is estimated to be 0.235g (EEC, 2006a).

Strong ground shaking can be mitigated to less than significant through facility design as required by the CBC (2001) and proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section.

Since no active faults are known to exist within the limits of the Eastshore site, the potential for surface rupture at the site is considered low.

Liquefaction

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 submerged fine-grained, poorly graded sands and silts. The *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay*

Region, California, (Witter et al., 2006) indicates the site is located in an area of moderate liquefaction susceptibility.

Information contained in the project geotechnical report (CH2MHill, 2007a) indicates that ground water is present at relatively shallow depths and that a loose to medium dense clayey sand layer is present across the site. This layer exhibits a potential for liquefaction during major earthquakes. Such conditions may also exist in the proposed project linear facility areas.

Based on the above information, the site can be characterized as having a moderate potential for liquefaction during a large earthquake; however, this potential impact can be mitigated to less than significant through facility design as required by proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and following the foundation design recommendations contained in the project geotechnical report (CH2MHill, 2007a).

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements.

Based on the information contained in the AFC (EEC, 2006a) and the project geotechnical report (CH2MHill, 2007a) the site is generally underlain by fine grain and clay soils, with thin interbeds of granular materials. As a result, the potential for localized areas of dynamic compaction is considered low for the site and associated project linear facilities.

Hydrocompaction

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon prolonged submergence. When destroyed, a substantial decrease in the material's void ratio is experienced even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since the plant site and proposed linear facilities are generally underlain by fine grain and clay soils with a relatively shallow ground water table, the potential for hydrocompaction of site soils is considered low.

Subsidence

Ground subsidence is typically caused when ground water is drawn down by irrigation activities such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on the underlying soils. This results in consolidation/ settlement of the underlying soils. The Eastshore project will obtain process water from

the City of Hayward. As such, drawdown of the water table due to Eastshore operations is not anticipated. Therefore, the potential for ground subsidence is considered low.

Due to the presence of compressible fine grain and clay soils to depth across the entire site, differential settlement due to conventional foundation surcharge loads could be excessive. As a result, design of the heavier structures at this site will most likely require the use of ground improvement techniques or deep foundations, as recommended in the project geotechnical report (CH2MHill, 2007a) to minimize any differential settlement to acceptable levels. This potential impact can be mitigated to less than significant through facility design as required by proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and following the foundation design recommendations contained in the project geotechnical report (CH2MHill, 2007a).

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. Surface materials present at the project site are expected to consist of granular fill materials and/or native clay soils. The native clay soils do exhibit medium to high expansion potential when subjected to changes in moisture content, which could impact performance of overlying structural improvements. This potential impact can be mitigated to less than significant through facility design as required by proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and following the foundation design recommendations contained in the project geotechnical report (CH2MHill, 2007a).

Landslides

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer, which exhibits a low strength. Debris flows are shallow landslides that travel downslope very rapidly as muddy slurry. The Eastshore site is relatively flat, exhibiting slopes on the order of 1 to 2 percent. As a result, the potential impact of landslides and debris flows to the Eastshore site is low.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which inundate low-lying areas adjacent to large bodies of water. Although the proposed Eastshore site is located on the east side of the San Francisco Bay; it is not in the direct path of any potential tsunami waves. As a result, the potential for tsunamis to affect the operation of the facility is considered low.

The anticipated finish grade of the site will be approximately 15 to 20 feet above mean sea level. An earthquake on one of the local faults could generate a seiche wave in the adjacent bay, but such waves are typically less than this height. As a result, the potential for a seiche wave to impact the operation of the facility is considered low.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (Wahrhaftig et al., 1993; Wagner et al., 1990; CDMG, 1978; California Department of Conservation, 2001; CDMG, 1990; CDMG, 1999; CGS, 2002; CDMG, 1998; CDMG, 1986; and CDMG, 1996b). Based on this review and the information contained in the AFC (EEC, 2006a) and the project geotechnical report (CH2MHill, 2007a), there are no known viable geologic or mineralogic resources located at or immediately adjacent to the proposed Eastshore site.

Paleontologic resources information has been submitted under a confidential filing for this project (DBA, 2006a). The information indicates several documented vertebrate fossil sites are present within 3 miles of the project site. The Holocene alluvium deposits equivalent to the Temescal Formation, typically present below a depth of 6 feet below existing grade, exhibit a high potential to contain paleontologic resources. Therefore, excavations to this depth or greater at the Eastshore plant site and for project linears could disturb such fossiliferous sediments and adversely impact paloentological resources.

Based on this information and staff's review of available information, the proposed Eastshore site and associated linears exhibit a high potential to contain significant paleontological resources when Holocene alluvium deposits are encountered during grading, foundation, and trenching activities.

Construction Impacts and Mitigation

Clay soils, which exhibit the potential to consolidate when subjected to loading and expand/contract when subjected to moisture content fluctuations, are present at the site and must be addressed during design and construction (See **Proposed Conditions of Certification, Facility Design**).

As noted above, no viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented within 3 miles of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since construction of the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high based on SVP assessment criteria. Potential impacts to paleontologic resources would include, but not be limited to, disturbing the natural depositional state of the resource that would prevent proper chronological inventory, in addition to damaging (i.e. crushing, cracking, and/or fragmentation) the resource itself. Proposed Conditions of Certification **PAL-1** to **PAL-7** are appropriate for excavation activities and are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When conducted well, the Conditions of Certification result is a net gain to the science of paleontology since fossils that would not other wise have been discovered can be collected, identified, studied, and properly curated. A paleontological

resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on the monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little change of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or from repeated out-of-compliance incidents by the earthwork contractor.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, liquefaction, and differential settlement, can be effectively mitigated through facility design (See **Proposed Conditions of Certification, Facility Design**) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

With the exception of strong ground shaking, potential liquefaction during an earthquake, potential differential settlement of heavily loaded structures, and expansive clay soils, the Eastshore site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. Strong ground shaking, potential liquefaction, potential differential settlement, and expansive soils must be mitigated through foundation design as required by the CBC (2001), the project geotechnical report (CH2MHill, 2007a), and proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Paleontological resources have been documented in the general area of the project. The potential impacts to paleontological resources due to construction activities that extend into native ground will be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-7.**

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to less than significant, and that the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low.

Based upon the literature and archives search, field surveys and the geotechnical report for the project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the power plant and associated linear facilities. Energy Commission staff agree with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards at the site, and that impacts to vertebrate fossils encountered during construction of the power plant and associated linear facilities would be mitigated to a level of insignificance.

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

A definition and general approach to closure is presented in the General Conditions section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the power plant location or along its proposed linear facilities. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Agency and public comments made on the PSA relative to Geology and Paleontology are generally responded to in the body of the text of this section and summarized below.

AGENCY COMMENTS ON THE PSA

No agency comments on geology and paleontology have been received for the Eastshore project.

PUBLIC COMMENTS ON THE PSA

Public comments made during the September 6, 2007 PSA workshop include the following:

A faulting and seismicity comment was made by an unidentified participant. The comment asked where the project is located in relation to the Hayward fault. The Hayward fault is located approximately 5.3 kilometers east of the project, as noted in the Faulting and Seismicity subsection of this section.

Two additional comments were made at the PSA workshop on September 6, 2007, regarding the project's potential impact on site ground water. Potential impacts to ground water are typically addressed in the Water Resources section and not in the Geology and Paleontology section. As a result, no additional information with respect to the project's potential effect on site ground water has been included in this section.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed conditions of certification are followed. The project should have no adverse impact with respect to design and construction of the project, and geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to Geology are covered under proposed Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Proposed paleontological conditions of certification follow.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall submit to the CPM to keep on file resumes of the qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. institutional affiliations, appropriate credentials and college degree;
2. ability to recognize and collect fossils in the field;
3. local geological and biostratigraphic expertise;
4. proficiency in identifying vertebrate and invertebrate fossils; and
5. at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year experience monitoring in California; or
- AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited to, the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to the PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for the monitoring and sampling;

6. A discussion of the procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all recently employed project managers, construction supervisors and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern. If appropriate, multi-lingual training shall be provided for workers not fluent in English. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils shall be provided for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP including the brochure with the set of reporting procedures the workers are to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and included in the Monthly Compliance Report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS immediately notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources Conditions of Certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours or Monday morning in the case of a weekend when construction has been halted due to a paleontological find.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports (MCR). The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities and general locations of excavations, grading, etc. A section of the report shall include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the project construction.

Verification: The project owner shall maintain in their compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resource Report (See **PAL-7**). The project owner shall be responsible to pay any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A

copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Eastshore Energy Center (Docket #06-AFC-6)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology and Biological Resources for all personnel (i.e., construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____Date: ___/___/____

Paleo Trainer: _____ Signature:_____Date: ___/___/____

Biological Trainer: _____ Signature:_____Date: ___/___/__

REFERENCES

Alquist – Priolo Earthquake Fault Zoning Act, 1993, California Codes; Public Resources Code; Sections 2621-2630.

Bryant, W.A., and Cluett, S.E., compilers, 1999, Fault number 54a, Calaveras fault zone, Northern Calaveras section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/rfegional/qfaults, accessed 01/19/2007 12:54 PM.

Bryant, W.A., and Cluett, S.E., compilers, 2000, Fault number 55a, Hayward fault zone, Northern Hayward section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/rfegional/qfaults, accessed 01/19/2007 12:49 PM.

CBC (California Building Code), 2001.

California Code of Regulations, Title 24 (*California Building Standards Code* [CBSC]), Part 2, *California Building Code* (CBC), 2001.

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POWER PLANT EFFICIENCY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

Eastshore Energy Center, LLC (Eastshore), if constructed and operated as proposed, would generate a nominal 115.5 MW of peaking electric power at an overall project fuel efficiency that is, at maximum full power, 43.3 percent in lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

The California Energy Commission (Energy Commission) makes findings as to whether energy use by the Eastshore project 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 project's energy consumption would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize those impacts. In this analysis, staff addresses the issue of the inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- Examine whether the facility will likely present any adverse impacts upon energy resources;
- Examine whether those adverse impacts are significant; and, if so,
- Examine whether feasible mitigation measures exist that would eliminate the adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

SETTING

Eastshore Energy, LLC (Eastshore) proposes to construct and operate the 115.5 MW (nominal net output) facility, which would provide intermediate and peaking power in addition to ancillary services such as voltage support, spinning and non-spinning reserve, and capacity during periods of high electricity demand. The project will be dispatched as needed by Pacific Gas and Electric Company (PG&E) or the California Independent System Operator (California ISO) (Eastshore 2006a, AFC §§ 1.2, 1.2.1, 1.8.4, 1.8.7, 2.1, 2.2.16, 10.3.2, 10.4). The project will consist of 14 natural gas-fueled

Wärtsilä Otto cycle reciprocating engine-generator sets and auxiliary equipment. Eastshore intends for the project to operate up to 4,000 hours per year, for an annual capacity factor of up to 45.7 percent (Eastshore 2006a, AFC §§ 1.2, 1.5, 2.1, 2.2.2, 2.2.16, 2.4.1, 10.3.2, 10.4). Each engine will be turbocharged and intercooled, and will be equipped with a lean-burn combustion system and selective catalytic reduction (SCR) to control oxides of nitrogen emissions, and a combustion catalyst to control carbon monoxide emissions. Each engine's water jacket, intercooler, and lube oil will be air cooled by a closed-loop cooling system using three fin-fan radiators (Eastshore 2006a, AFC §§ 1.2, 2.2.3, 2.2.4, 2.4.2.1.1, 2.4.2.3).

The project will be constructed on a site zoned for industrial use in the City of Hayward in Alameda County. The site has access to natural gas, electric transmission, and potable water (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.1.1, 2.2.6, 2.2.7.2, 2.2.8, 2.4.3, 2.4.4, 6.1, 7.1, 10.3.1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE SIGNIFICANCE OF ENERGY RESOURCES

CEQA guidelines state that 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 the consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient, and unnecessary consumption of energy (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Under the range of predicted site-ambient conditions, the Eastshore facility would burn natural gas at a rate varying from 36 million to 909 million Btu[1] per hour LHV (Eastshore 2006a, AFC §§ 2.2.6, 10.4; Fig. 2.2-4). This is a substantial rate of energy consumption, and has the potential to impact energy

[1] British thermal units

supplies. Under expected project conditions,[2] electricity will be generated at a full-load efficiency of approximately 43.3 percent LHV (Eastshore 2006a, AFC §§ 1.8.5, 1.8.7, 2.2.2,10.4; Fig. 2.2-4).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas supply for the project (Eastshore 2006a, AFC §§ 1.2, 1.5, 2.1, 2.1.1, 2.2.6, 2.4.3, 6.1, 10.3.1; App. 6A). Natural gas for the project will be supplied through the existing PG&E Line 153 natural gas pipeline east of the project site. PG&E transports natural gas from the major gas-producing areas of the Rocky Mountains, Canada, and the Southwest. This represents a resource of considerable capacity and an adequate source for a project of this size. It is therefore highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

Power plants are high-value gas consumers. Should gas supplies or gas transport capacity fall short, power plants would not be curtailed until after most or all industrial and commercial users have been curtailed. Given PG&E's extensive gas supply system, staff does not envision the project suffering significant risk of gas supply curtailment.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

PG&E will purchase and deliver the requisite natural gas fuel to the project from the existing PG&E Line 153 via a new 4½-inch diameter, 200 foot-long interconnection (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.1.1, 2.2.6, 2.4.3, 6.1, 10.3.1; App. 6A). This is a resource with adequate delivery capacity for a project of this size. There is no realistic likelihood that the Eastshore project will require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the Eastshore project or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The Eastshore facility could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's fuel use. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires the examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power-producing system and by the selection of the equipment used to generate power.

[2] The engines produce a constant amount of power at full load, at constant fuel efficiency, in ambient temperatures ranging from 32°F to 100°F (Eastshore 2006a, AFC Fig. 2.2-4).

(a) Project Configuration

The applicant's stated project objective is to support power supply reliability for the City of Hayward, provide voltage support for the region, and reduce power losses due to imported energy. This will be accomplished by providing intermediate and peaking power and power quality services including spinning and non-spinning reserves during periods of high electricity demand, which typically occur on hot summer days. The Eastshore project will be economically dispatched by PG&E or the California ISO (Eastshore 2006a, AFC §§ 1.2, 1.2.1, 1.6, 1.8.4, 1.8.7, 2.2.16, 9.1, 10.3.2, 10.4). The project configuration of multiple reciprocating engine-generator sets is consistent with this objective. The project will be configured as 14 engine gensets in parallel, in which up to 8.25 MW of electricity is generated by each of one or more engine gensets (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.2.2, 2.2.4, 2.2.16, 2.4.1, 2.4.2.1.1, 10.3.2, 10.4). This configuration, with its short start-up time, fast ramping[3] capability, and consistently high fuel efficiency throughout the load range, is well suited for providing both intermediate and peaking power. When reduced output is required, one or more engine-generators can be shut down, allowing the remaining machine(s) to produce a percentage of full power at optimum efficiency, rather than operating a single, larger machine at a less efficient part-load output.

The applicant intends for the Eastshore facility to operate in intermediate and peaking duty at an annual capacity factor of approximately 20 percent for all 14 engine gensets, although the project will be permitted to operate at an annual capacity factor of up to 45.7 percent (Eastshore 2006a, AFC §§ 1.2, 1.5, 2.1, 2.2.2, 2.2.16, 2.4.1, 10.3.2, 10.4). This is equivalent to each machine running between 1,739 and 4,000 hours per year.

(b) Equipment Selection

Modern reciprocating engine-generator sets represent highly fuel-efficient electric generating technology. The Eastshore facility will use 14 Wärtsilä 20V34SG engine gensets. The 34SG engine is one of the most efficient and cleanest-burning machines available (Eastshore 2006a, AFC §§ 1.2, 1.8.5, 1.8.7, 2.1, 2.2.2, 2.2.4; Fig. 2.2-4). This engine is nominally rated at 8.4 MW gross at a fuel efficiency approaching 45 percent LHV (Wärtsilä 2006). The facility would actually produce 115.5 MW net (8.25 MW per machine) at a site-rated fuel efficiency of 43.3 percent LHV (Eastshore 2006a, AFC §§ 1.2, 1.8.5, 1.8.6, 1.8.7, 2.1, 2.2.2, 10.4;Figure 2.2-4). This site rating differs from nominal figures due to site specific ambient conditions (altitude and temperature) and power losses from parasitic loads.

(c) Efficiency of Alternatives to the Project

(i) Alternative Generating Technologies

Alternative generating technologies for the Eastshore project are considered in the AFC (Eastshore 2006a, AFC §§ 9.1, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5). Several fossil fuels (natural gas, coal, and oil), hydroelectric, biomass, solar, and wind power were all considered. Coal and oil are too highly polluting to be viable in Alameda County. Usable hydro and geothermal resources do not exist in Alameda County. Biomass is not available in sufficient quantities. Solar and wind are not dispatchable, and are therefore

[3] Ramping increases and decreases electrical output to meet fluctuating load requirements.

incapable of producing the needed ancillary services[4]. Staff agrees with the applicant that only natural gas-burning technologies are feasible for this project.

(ii) Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

(iii) The Wärtsilä 20V34SG

The applicant would use 14 Wärtsilä 20V34SG engine generator sets (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.2.2, 2.2.4, 2.4.2.1.1, 9.6; Fig. 2.2-4). The Wärtsilä engine genset selected is the largest and most efficient lean-burn machine now available. This machine is nominally rated at 8.4 MW gross and 44.1 percent efficiency LHV at International Standards Organization (ISO)[5] conditions (Wärtsilä 2006). Staff compares alternative machines' ISO ratings as a common baseline since project-specific ratings are not available for the alternative machines.

Where a gas turbine generator's fuel efficiency drops off rapidly when the machine is operated at less than full load, the efficiency of a reciprocating engine such as the Wärtsilä suffers much less at lower outputs. At 75 percent load, the Wärtsilä's efficiency is 92 percent of that at full load; at 50 percent load, it drops only to 89 percent of full-load efficiency. Furthermore, the machine is capable of ramping at high rates. In addition, the Wärtsilä can go from a cold start to full load in 10 minutes (Eastshore 2006a, AFC §§ 1.8.5, 1.8.7, 2.2.2, 9.6, 9.6.1, 10.4; Fig. 2.2-4; Wärtsilä 2006; and staff calculations). This operating flexibility makes this the most capable machine available in its size range for providing ancillary services like peaking, load following, and spinning and non-spinning reserve.

(iv) Alternatives to the Wärtsilä 20V34SG

Alternative machines that might meet the project's objectives are simple-cycle gas turbines and other reciprocating engines.

(d) Gas Turbine Generators

Gas turbine generators that could perform in intermediate and peaking service include the General Electric (GE) LM6000 SPRINT, the Siemens Power SGT-800, and the Pratt & Whitney FT8 TwinPac, all of which are aeroderivative machines adapted from aircraft engines, and the GE LMS100, a new hybrid machine that incorporates both aeroderivative and industrial turbine technologies.

[4] Eastshore proposes to offer typical intermediate load-following and peaking power service, including flexible output (from 4 to 115.5 MW), spinning reserve, and rapid start (non-spinning reserve).

[5] ISO standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

The GE LM6000PC SPRINT gas turbine generator in a simple cycle configuration is nominally rated at 50.1 MW and 40.5 percent efficiency LHV at ISO conditions (GTW 2006).

The Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration is nominally rated at 51.4 MW and 38.4 percent efficiency LHV at ISO conditions (GTW 2006).

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 45 MW and 37 percent efficiency LHV at ISO conditions (GTW 2006).

The GE LMS100, currently available only in simple cycle configuration, is nominally rated at 98.8 MW and 45.1 percent efficiency at ISO conditions (GTW 2006).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LM6000PC SPRINT	50.1	40.5 %
P & W FT8 TwinPac	51.4	38.4 %
Siemens SGT-800	45	37.0 %
GE LMS100	98.8	45.1 %
Wärtsilä 20V34SG	**8.4**	**44.1**

Source: GTW 2006, Wärtsilä 2006

While the LMS100 enjoys a slight advantage in fuel efficiency over the Wärtsilä machine, the Wärtsilä's smaller generating capacity makes it more attractive for peaking and load following. The LMS100 has been specifically designed for flexible output and high efficiency at part load; in this respect it matches the Wärtsilä. However, the nearly 100-MW output of the LMS100 limits its flexibility. It can be curtailed to only about 30 MW or so before fuel efficiency drops prohibitively low. The Eastshore project, however, with 14 reciprocating engines, could be curtailed to about 4 MW without a significant drop in fuel efficiency. Staff agrees with the applicant that a battery of large reciprocating engines is an appropriate choice for the Eastshore facility.

(e) Reciprocating Engines

The applicant considered machines by Cummins, Caterpillar, Waukesha, and MAN B&W, in addition to Wärtsilä. The Wärtsilä was selected based upon generating capacity (one of the largest available), air emissions, fuel efficiency, cost, and schedule concerns. Staff cannot find fault with the choice of Wärtsilä as the project's engine supplier.

In conclusion, the project configuration and generating equipment chosen (14 reciprocating engines) appear to represent the most efficient feasible combination to satisfy the project's objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

The only identified nearby project that could potentially combine with the Eastshore project to create cumulative impacts on natural gas resources is Calpine's Russell City Energy Center, a nominal 600 MW combined-cycle power plant project. The PG&E

natural gas supply system is adequate to supply both the Eastshore and Russell City projects without adversely impacting its other customers. In fact, the power purchase agreement between PG&E and Eastshore calls for PG&E to acquire and supply natural gas for the project (Eastshore 2006a, AFC §§ 2.4.3, 10.3.1). Staff therefore believes that the Eastshore project will create no cumulative impacts on natural gas fuel supplies.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 115.5 MW of intermediate and peaking electric power, at an overall project fuel efficiency of 43.3 percent LHV at full load. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

Eastshore Energy, LLC (Eastshore) predicts an equivalent availability factor of 94 to 98 percent, which California Energy Commission (Energy Commission) staff believes is achievable. Based on a review of the proposal, staff concludes that the Eastshore facility will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, Energy Commission staff examines the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this level of reliability as a benchmark since it ensures that the resulting project would not likely degrade the overall reliability of the electric system with which it is connected (see **Setting** below).

The scope of this power plant reliability analysis covers:

- Equipment availability;
- Plant maintainability;
- Fuel and water availability; and
- Power plant reliability, in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable operation of a power plant. While Eastshore has predicted an equivalent availability factor of between 94 and 98 percent for its proposed facility, (see below), staff uses typical industry norms as the benchmark, instead of Eastshore's own projection, in order to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) pertain to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, primarily the California Independent System Operator (California ISO), who purchase, dispatch, and sell electricity throughout California. How the California ISO and other control area operators will continue to ensure statewide system reliability is an ongoing process. Protocols are still being developed and put in place to maintain reliability in the state's

competitive energy market. “Must-run” power purchase agreements and “participating-generator” agreements are two existing mechanisms that ensure an adequate supply of reliable electricity.

The California ISO also requires that power plants selling ancillary services, as well as those bound by reliability must-run contracts, fulfill certain requirements, including:

- Filing periodic reports on plant reliability;
- Reporting all outages and their causes; and
- Scheduling all planned maintenance outages with the California ISO.

The California ISO’s mechanisms to ensure adequate power plant reliability were developed with the assumption that individual power plants competing to sell their power into the statewide grid would maintain a level of reliability similar to that of regulated power plants of past decades. There is, however, reason to believe that, under today’s free market conditions, the financial pressure on power plant owners to minimize their capital outlays and maintenance expenditures may be acting to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is conceivable that, if significant numbers of power plants were to demonstrate lower-than-historical levels of individual reliability, the California ISO’s system reliability assumptions could prove to be invalid, with predictably negative results. Until California’s restructured competitive electricity market has undergone a more adequate shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff recommends that power plant owners continue to build and operate their projects to the reliability standards to which all in the industry have been traditionally held.

Eastshore proposes to build and operate a proposed 115.5 MW (nominal net output) facility that would provide intermediate and peaking power and ancillary services including black start, voltage support, spinning and non-spinning reserve, and capacity during high-demand periods (Eastshore 2006a, AFC §§ 1.2, 1.2.1, 1.8.4, 1.8.7, 2.1, 2.2.13.8, 2.2.16, 10.3.2, 10.4). The project is expected to achieve an equivalent availability factor (EAF) of 98 percent in the summer months, and 94 percent during the remainder of the year.[1] The Eastshore facility is designed to operate between approximately 3 percent and 100 percent of base load (4 to 115.5 MW), and is expected to operate at a 20 percent capacity factor,[2] and be dispatched to serve peak loads during periods of high demand (typically summer days) (Eastshore 2006a, AFC §§ 2.2.2, 2.2.16, 2.4.1, 10.3.2, 10.4).

[1] Scheduled maintenance will be performed during non-summer months when dispatch is less likely.

[2] The project will be permitted to operate up to a capacity factor of 45.7 percent, or 4,000 hours per year.

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings about how the project will be designed, sited, and operated to ensure the project's safe and reliable operation [Cal. Code Regs., tit. 20, § 1752(c)]. Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system with which it is connected. This is likely the case if the project shows a degree of reliability at least equal to that of other power plants on the system.

The availability factor for a power plant is the percentage of the time that it is available to generate power. Both planned and unplanned outages reduce a plant's availability factor. Measures of power plant reliability are based on its ability to generate power when available, and are based on starting failures and unplanned - or forced - outages. For practical purposes, reliability can be viewed as a combination of these two industry measures, essentially deeming a power plant reliable when it is available to operate when dispatched. Throughout its intended 30-year life (Eastshore 2006a, AFC § 2.2.16, 2.4.1, 10.3.2), the Eastshore facility is expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for either maintenance or repairs. This reliability is achieved by ensuring adequate levels of equipment availability, critical component redundancy, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the Eastshore project and compares them with industry norms. If they compare favorably, staff can comfortably conclude that the Eastshore project will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability is assured by applying appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant, and by providing for the adequate maintenance and repair of both the plant's equipment and systems (discussed below).

Quality Control Program

Eastshore proposes a QA/QC program (Eastshore 2006a, AFC § 2.4.5) typical of the power industry. Equipment will be purchased from qualified suppliers, based upon technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs, and quality history will all be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield acceptable reliability levels in both design and construction. To ensure its implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled Facility Design.

PLANT MAINTAINABILITY

Equipment Redundancy

A peaking generating facility typically provides adequate opportunity for maintenance work during downtime. During periods of extended dispatch, however, which occur when other major generating or transmission facilities are disabled, the facility could be required to operate for extended periods. A typical approach for ensuring reliability under these circumstances is to provide redundant pieces of the equipment most likely to require service or repair.

Eastshore plans to provide appropriate redundancy of function for the project (Eastshore 2006a, AFC §§ 1.2, 1.8.5, 2.1, 2.2.2, 2.2.4, 2.2.13.3, 2.4.1, 2.4.2.1.1, 2.4.2.2, 2.4.2.3, 2.4.2.4.1, 2.4.2.4.2; Table 2.4-1). Since the project consists of 14 reciprocating engine generators operating in parallel as independent equipment trains, the project is inherently reliable. A single equipment failure cannot disable more than one train, thereby allowing the plant to continue to generate, though at slightly reduced output. Furthermore, all plant ancillary systems are designed with enough redundancy to ensure continued operation in the event of equipment failure. Staff believes that equipment redundancy will be sufficient for this project.

Maintenance Program

Eastshore proposes to establish a preventive plant maintenance program typical of the industry (Eastshore 2006a, AFC §§ 2.2.16, 2.4.1, 10.3.2). Equipment manufacturers provide maintenance recommendations with their products, so the applicant will base its maintenance program on these recommendations. The program will encompass both preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of both fuel for generation and water for cooling and process use is necessary to ensure reliability. Lacking long-term availability of either source, the service life of the plant could be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The Eastshore project will burn natural gas transported through Pacific Gas and Electric Company's (PG&E) gas transmission system. Natural gas will be supplied to the project via a new 4.5-inch diameter 200-foot long interconnection from PG&E's existing Line 153 east of the site (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.1.1, 2.2.6, 2.4.3, 6.1, 10.3.1; App. 6A). This natural gas transport system has considerable capacity and offers access to adequate supplies of gas from the three major gas-producing regions of the Rocky Mountains, Canada, and the Southwest. Staff agrees with the applicant's prediction that there will be both an adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The Eastshore project will use potable water from the City of Hayward's municipal water system for potable, sanitary, fire protection, and landscape irrigation uses through connection with an existing on-site connection to the water main in Clawiter Road (Eastshore 2006a, AFC §§ 1.2, 1.8.8, 2.1, 2.1.1, 2.2.2, 2.2.7.2, 2.4.4, 7.1). A 35,000-gallon raw water storage tank will store raw water for fire protection purposes (Eastshore 2006a, AFC §§ 1.2, 2.1, 2.2.7.2). Since the engine gensets are air cooled, plant water consumption is minimal. Staff believes that this water source, combined with the onsite storage capacity, provides a reliable supply of water for the plant's minimal needs. For further discussion of water supply, see the **Soil and Water Resources** section of this document.

POWER PLANT RELIABILITY WITH RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of any power plant. High winds, tsunamis (tidal waves), seiches (waves in inland bodies of water), and flooding will not likely represent a hazard for this project, but seismic shaking (earthquake) may present a credible threat to reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (Eastshore 2006a, AFC §§ 1.7.15, 2.3.1); see the section of this document entitled **Geology and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (Eastshore 2006a, AFC §§ 1.7.15, 2.3.1, 10.5.1; Table 10.5-1; App. 10). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking, compared with older facilities, because these LORS have been periodically and continually upgraded. Because it will be built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants on California's electric power system. Staff has proposed conditions of certification to ensure this high level of reliability; see the section of this document entitled **Facility Design**. In light of the historical performance of California's power plants and the electrical system in general during seismic events, staff believes there is no special concern with power plant functional reliability due to seismic events.

Flooding

The Eastshore site does not lie within either a 100-year or a 500-year flood plain (Eastshore 2006a, AFC § 2.3.1). Staff believes there are no concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology** elsewhere in this document.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC), which sets national standards. NERC continually polls utilities throughout the U.S. and Canada on project reliability through its Generating Availability Data System (GADS), and periodically summarizes and publishes these statistics on the Internet (http://www.nerc.com). NERC

reports the following generating unit statistics for the years 2000 through 2005 (NERC 2006).

For diesel engine[3] units (all MW sizes):
Equivalent Availability Factor = 94.50 percent

The engines that will be installed in the Eastshore project are not new. Wärtsilä, their manufacturer, has been in the business of manufacturing power plants since 1834, and is widely recognized as the premier manufacturer of large reciprocating engines for marine and power generation plants worldwide. The 34SG series of natural gas-fired lean-burn engines has been on the market since 1995, and at least 222 34SG engines have been installed in power plants around the world, totaling more than 1,400 MW. This technology is fully mature.

Eastshore's prediction of an equivalent availability factor of 94 to 98 percent (Eastshore 2006a, AFC §§ 2.2.2, 2.2.16, 2.4.1, 10.3.2, 10.4) appears realistic compared with NERC's figure for similar plants throughout the United States and Canada (see above), especially in light of the proposed dispatch scenario - intermediate and peaking duty serving primarily summer air conditioning loads. Since the plant will consist of 14 parallel engine gensets, maintenance can be scheduled during times of the year when the plant's full output is not required to meet electricity demand. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for the design, procurement, and construction of a reliable power plant are in keeping with industry norms, and staff believes that the plant will operate reliably as a result.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to increase local system reliability by providing intermediate and peaking power and ancillary services including black start, voltage support, spinning and non-spinning reserve, and capacity during periods of high demand (Eastshore 2006a, AFC §§ 1.2, 1.2.1, 1.8.4, 1.8.7, 2.1, 2.2.13.8, 2.2.16, 10.3.2, 10.4). The fact that the project consists of 14 engine generator sets configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thereby allowing the plant to continue to generate, though at slightly reduced output.

The reciprocating engines at the proposed Eastshore facility represent a fully mature technology; they can be expected to deliver high availability. Eastshore's projection of an equivalent availability factor of 94 to 98 percent appears achievable. Staff believes this should also provide an adequate level of reliability.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public.

[3] NERC GADS statistics are not available specifically for Otto cycle engines, but the Wärtsilä engines in the Eastshore project are nearly identical to similar-sized diesels.

CONCLUSION

Eastshore predicts an equivalent availability factor of 94 to 98 percent, which staff believes is achievable. Based on a review of the project proposal, staff concludes that the plant would be built and would operate in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

Eastshore 2006a. Eastshore Energy, LLC. Application for Certification for the Eastshore Energy Center. Volumes 1 and 2. Submitted to the California Energy Commission, September 22, 2006.

McGraw-Hill 1994. McGraw-Hill Energy Information Services Group. *Operational Experience in Competitive Electric Generation, an Executive Report, 1994.*

NERC 2006. North American Electric Reliability Council. *2000-2005 Generating Availability Report.*

Wärtsilä 2006. Wärtsilä web page at: http://www.wartsila.com/

TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Eastshore Energy Center outlet transmission lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The Eastshore Energy Center interconnection with the transmission grid would not require additional downstream transmission facilities (other than those proposed by the applicant) that require California Environmental Quality Act review.

- The marginal incremental overloads caused by the addition of the Eastshore Energy Center, under contingency analysis, would not trigger any transmission system upgrades. There are no adverse impacts to the transmission system from the project's integration;
- The existing breakers are adequate to withstand the post-project incremental fault currents; and
- The proposed interconnecting facilities between the new combustion turbine generators and Pacific Gas and Electric Company's Eastshore Substation, including the step-up transformers, the 115 kV overhead transmission line, and terminations, are adequate, and planned in accordance with good utility practices, and acceptable to staff according to engineering laws, ordinances, regulations, and standards.

INTRODUCTION

STAFF ANALYSIS

The **Transmission System Engineering** (TSE) analysis examines whether the facilities associated with Eastshore's proposed interconnection conform to all of the applicable laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. Additionally, under California Environmental Quality Act (CEQA), the California Energy Commission (Energy Commission) must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). The Energy Commission must therefore identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are both required for interconnection and represent the "whole of the action."

Energy Commission staff relies upon the interconnecting authority, in this case the California Independent System Operator (California ISO), for the analysis of impacts on the transmission grid from the proposed interconnection, as well as the identification and approval of new or modified facilities downstream that could be required for mitigation. The proposed Eastshore Energy Center (Eastshore) project would connect to the Pacific Gas and Electric Company (PG&E) transmission system and require both analysis by PG&E and approval by the California ISO.

PACIFIC GAS AND ELECTRIC'S ROLE

PG&E is responsible for ensuring electric system reliability on its transmission system with the addition of proposed transmission modifications, and determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards. PG&E will provide both the analysis and necessary reports in its System Impact and Facilities studies and its approval for both the facilities and required changes to its transmission system.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for dispatching generating units in California, establishing the order in which electricity will be used, ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards and procedures necessary for system reliability. The California ISO will review PG&E's studies to ensure the adequacy of the proposed Eastshore transmission interconnection. The California ISO will also determine the reliability impacts of the proposed transmission modifications on PG&E's transmission system in accordance with all applicable reliability criteria. According to California ISO tariffs, the "need" for transmission additions or upgrades downstream from the interconnection point must be determined in light of overall system reliability. The California ISO will review the System Impact Study (SIS) performed by PG&E and/or a third party, provide its analysis, conclusions, and recommendations, and ultimately issue a preliminary approval or concurrence letter to PG&E. Upon completion of the PG&E Facilities Study (FS), the California ISO will also review the study results, provide conclusions and recommendations, and issue its final approval or disapproval letter for interconnection of the proposed Eastshore project. If necessary, the California ISO will provide written and verbal testimony in support of its findings at Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- The North American Electric Reliability Council's (NERC) Reliability Standards for the bulk electric transmission systems of North America provide national policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. The NERC planning standards provide for system performance levels for both normal and contingency conditions. With regard to power flow and stability simulations, while these Standards are similar to NERC/WECC Planning Standards, certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards for Transmission System Contingency Performance. The NERC's planning standards apply not only to interconnected system operation but to individual service areas as well (NERC 2006).
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the NERC's Reliability Standards to provide the system performance standards used to assess the reliability of the interconnected system. These standards require the uninterrupted continuity of service as their first priority, and the preservation of interconnected operation as their secondary priority. Some aspects of NERC/WECC standards are more stringent or specific than NERC standards alone. These standards include the

reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree upon Section I.A of the standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and the loss of load that could occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as the loss of either multiple 500 kV lines along a common right of way, and/or the loss of multiple generators). While controlled loss of generation or load or system separation is permitted under certain circumstances, uncontrolled loss is not permitted (WECC 2002).

- California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction,* specifies uniform requirements for the construction of overhead electric lines. Compliance with this order ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of overhead electric lines, and for the safety of the general public.
- CPUC General Order 128 (GO-128), *Rules for Underground Electric Line Construction,* establishes uniform requirements for construction of underground electric lines. Compliance with this order also ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of underground electric lines, and for the safety of the general public.
- National Electric Safety Code 1999 provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- California ISO Planning Standards also provide standards and guidelines that assure the adequacy, security and reliability during the planning process of the California ISO's electric transmission facilities. The California ISO Planning Standards incorporate both NERC and WECC Planning Standards. With regard to power flow and stability simulations, the California ISO's Planning Standards are similar to those of the NERC and WECC and to the NERC's Planning Standards for transmission system contingency performance. However, the California ISO's standards also provide additional requirements that are not found in the NERC, WECC, or NERC planning standards. The California ISO standards apply to all participating transmission owners that interconnect to both the California ISO-controlled transmission grid and to neighboring grids not operated by the California ISO (California ISO 2002a).
- California ISO and Federal Energy Regulatory Commission (FERC) electric tariffs provide guidelines for the construction of all transmission additions and upgrades (projects) within the California ISO-controlled grid. The California ISO also

determines the “need” for the proposed project where it will promote economic efficiency and maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides operational review for all facilities that are to be connected to the California ISO grid (California ISO 2003a).

PROJECT DESCRIPTION

The proposed Eastshore project would be a simple-cycle power generating facility located in the City of Hayward, Alameda County, California. The project would consist of 14 natural gas-fired reciprocating engine generators with a nominal output of approximately 115 MW. Two sets of generators, with seven generators in each set, would interconnect with the 13.8 kV bus bar of the project switchyard and its dedicated 60/72/90 MVA step-up (13.8/115 kV) transformers. The low sides of the generator step-up transformers would be connected through circuit breakers to the 13.8 kV bus bar of the switchyard. The high sides of the generator step-up transformers would be connected through circuit breakers and disconnect switches to the 115 kV bus bar in the switchyard. The 115 kV generator tie line (715 kcmil aluminum overhead conductor) would interconnect with the switchyard and PG&E’s existing 115/230 kV Eastshore Substation.

The 1.2-mile-long generator tie line would be supported by new 115 kV transmission wood or steel poles in the existing corridor of PG&E’s 12 kV distribution lines. The existing distribution line corridor may require widening to accommodate 10 to 12 new transmission poles. The applicant has proposed to use four different pole types with specific heights. The 80-foot pole structures would support the 115 kV transmission lines, the 85-foot pole structures would support the 115 kV transmission lines with underbuilt 12 kV distribution lines and a 90-foot pole structure would be placed on the south side and a 60-foot pole structure would be placed on the north side of Highway 92.

PG&E’s existing Eastshore Substation would require a new 115 kV generator tie breaker, disconnect switches, and associated protective relays to facilitate interconnection with the Eastshore project. Power would flow into PG&E’s transmission grid over outgoing transmission lines from the PG&E Eastshore Substation (EEC 2006a, Section 1.2, 2.1, 5.2 and CH2MHill 2007c, Section 6).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of either a proposed generating unit or transmission facility to the grid, the interconnecting utility (PG&E in this case) and the control area operator (California ISO) are jointly responsible for ensuring the grid’s reliability. These entities together determine the project’s impact on the transmission system and any needed mitigation measures to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. A SIS and a FS are used to determine the impacts of the proposed project on the transmission grid. Staff relies on the studies and any review conducted by the California ISO to determine the project’s effect on the transmission grid and to identify necessary

downstream facilities or indirect project impacts required to bring the transmission system into compliance with applicable reliability standards.

The SIS and FS analyze the grid both with and without the proposed project, under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation, and are thus are based upon a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the California ISO. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties.

If the studies show that the interconnection of the project could cause the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by the California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as the “whole of the action,” the Energy Commission must then analyze the environmental impacts of these modifications or additions.

STATUS OF PG&E STUDIES

PG&E has completed the System Impact Study and the Facilities Study reports (Revision 2). Both of these reports identified mitigation measures for all identified overloads.

STATUS OF CALIFORNIA ISO REVIEW

The California ISO has reviewed the SIS and the FS and concurs with both the study results and the proposed mitigation measures. The California ISO granted Final Interconnection Approval for the interconnection of the Eastshore project on March 8, 2006 with an operation date of May 2007 and reaffirmed in a letter dated January 23, 2007, with a new proposed operation date of fourth quarter 2008 (California ISO 2007a).

SCOPE OF SYSTEM IMPACT STUDY

The SIS was performed by PG&E at the request of the project owner, to identify transmission system impacts caused by the Eastshore project on PG&E’s 115/230 kV transmission system. The SIS included a Power Flow study, Short Circuit study, and Dynamic Stability analyses. The study modeled the proposed Eastshore project for a net output of 115 MW. The base cases included all planned generating facilities in PG&E’s service territory, the Sacramento Municipal Utility District, the Turlock Irrigation District, and Silicon Valley Power, whose on-line schedules are either concurrent with or precede the proposed project. Detailed study assumptions are described in the SIS. Power Flow studies were conducted both with and without the Eastshore project

connection to the PG&E grid, at the Eastshore Substation using full loop base cases modeling 2007 summer peak and summer off-peak conditions. The Power Flow study assessed the project's impact on the thermal loading of the transmission lines and equipment using the 2007 summer peak full loop and summer off-peak full base cases. Dynamic Stability analyses were conducted using the 2007 summer peak base cases to determine whether the project would create instability in the system following certain selected outages. The Short Circuit study was conducted with and without the project to determine if its interconnection could overstress the existing substation facilities (CH2MHill 2007b).

Power Flow Study Results and Mitigations

The Power Flow Study has not identified any mitigation measures required under normal or emergency condition to interconnect the project to the PG&E transmission grid (CH2MHill 2007b, Section 6).

- Under normal conditions: The Power Flow Study indicated the addition of the Eastshore project would not cause any overloads under normal operating conditions.
- Under N-1 contingency conditions: The Sobrante-Grizzly-Claremont no. 2 115 kV line would be loaded to 100 percent of its rated capacity. The Eastshore project increases the post contingency loading by 1 percent on the Sobrante-Grizzly–Claremont #2 transmission line, but would not require any mitigation measures.
- Under N-2 contingency conditions: The Oakland D-Oakland L 115 kV line would be loaded to 100 percent of its rated capacity. The Eastshore project increases the post contingency loading by 1 percent on the Oakland D-Oakland L 115 kV line, but would not require any mitigation measures.

Dynamic Stability Study Results

Dynamic Stability studies for the Eastshore project were conducted using 2007 summer peak full loop base case to determine if the project would create any adverse impact on the stable operation of the transmission grid in the event of selected N-1 and N-2 outages. The results indicate there are no adverse impacts on the stable operation of the transmission system following these selected disturbances, as shown in the SIS for integration of the project (CH2MHill 2007b, Section 7).

Short Circuit Study Results and Mitigations

Short Circuit studies were conducted to determine the degree to which the addition of the Eastshore project increases fault duties at PG&E's substations, adjacent utility substations, and other 115 kV and 230 kV busses within the study area. The busses at locations where faults were simulated, the maximum three phase and single line-to-ground fault currents at these busses, both with and without the project, and information on the breaker duties at each location are each summarized in Table 8-1 (Short Circuit Study Results of the System Impact Study Report). The Short Circuit study shows that addition of the project would marginally increase fault currents at five substations but would not require replacement of any breakers. The existing breakers are adequate enough to withstand any post project incremental fault currents identified in the Short Circuit study (CH2MHill 2007b, Section 8).

COMPLIANCE WITH LORS

The SIS indicates that the project interconnection would comply with all NERC/WECC planning standards and California ISO reliability criteria. The applicant will design, build, and operate the proposed 115 kV overhead transmission line. Proposed modifications to the Eastshore Substation would be performed by PG&E. Staff concludes that, with implementation of the proposed conditions of certification, the project will meet the requirements and standards of all applicable LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE have been received.

CONCLUSIONS AND RECOMMENDATIONS

The proposed Eastshore project outlet transmission lines and terminations are acceptable and would comply with all applicable LORS. The project interconnection to the grid would not require additional downstream transmission facilities (other than those proposed by the applicant) that require CEQA review.

- The marginal incremental overloads caused by the addition of the project under post contingency analyses would not trigger any transmission system upgrades. There are therefore no adverse impacts to the transmission system as a result of the project's integration.
- The existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.
- The proposed interconnecting facilities between the new combustion turbine generators and the Eastshore Substation, including the step-up transformers, the 115 kV overhead transmission line, and terminations. They are adequate, and planned in accordance with good utility practices, and acceptable to staff in accordance with engineering LORS.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall provide the Compliance Project Manager (CPM) and the Chief Building Official (CBO) with 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 both a description and a 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 fewer, if mutually agreed upon by the project owner and the CBO) before the start of construction, the project owner shall submit the schedule, a master drawing list, and a master specifications list to both the CBO and the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a

list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with both CPM and CBO approval. The project owner shall provide schedule updates in the monthly compliance report.

Table 1: Major Equipment List
Breakers
Step-up transformer
Switchyard
Busses
Surge arrestors
Disconnects
Take-off facilities
Electrical control building
Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 Before the start of construction, the project owner shall assign to the project an electrical engineer and at least one of each of the following:

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 and fully competent and proficient in the design of power plant structures and equipment supports; or

D. a mechanical engineer (Business and Professions Code Sections 6704 et seq. require state registration to practice as either a civil engineer or a structural engineer in California).

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers as long as each engineer is responsible for a particular segment of the project, e.g., proposed earthwork, civil structures, power plant structures, or 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 as required by 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 earth work and require changes; if site conditions are unsafe or do not conform with the predicted conditions used as the basis for design of earth work 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 fewer if mutually agreed to by the project owner and the CBO) before the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (2001 California Building Code, Chapter 1, section 108.4, approval required; Chapter 17, section 1701.3, *Duties and Responsibilities of the Special Inspector;* Appendix Chapter 33, section 3317.7, *Notification of Noncompliance*). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and refer to this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for the disapproval, along with the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any construction until plans for that increment of construction 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 fewer if mutually agreed to by the project owner and the CBO) before 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, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all 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, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO.

A. The Eastshore project will be interconnected to PG&E's Eastshore Substation via a single 115 kV transmission line, approximately 1.2 miles long, with 715 kcmil aluminum conductor or conductor with a higher rating.

B. The generation tie line will require the replacement of 10 to 12 transmission poles that accommodate both the 12 kV and 115 kV lines.

C. The existing Eastshore Substation will require a new 115 kV generation tie breaker and associated protective relays to facilitate interconnection of the project.

D. The proposed protection requirements will consist of a fully redundant, double-pilot current differential protection scheme.

E. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.

F. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

G. 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.

H. The project conductors shall be sized to accommodate the full output of the project.

I. Termination facilities shall comply with applicable PG&E interconnection standards.

J. The project owner shall provide to the CPM:

   i. the final Detailed Facility Study (DFS), including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable;

   ii. executed project owner and California ISO facility interconnection agreement.

K. A request for minor changes to the facilities described in this condition may be allowed if the project owner informs the CBO and CPM and receives approval for the proposed change. 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 before the start of construction of transmission facilities (or fewer days if mutually agreed upon by the project owner and CBO), the project owner shall submit to the CBO for approval:

A. Design drawings, specifications, and calculations conforming with 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*, CA ISO standards, National Electric Code (NEC) 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"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

C. electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through k), above;

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

D. the final DFS, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM;

E. 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 the facilities described in this condition and request approval to implement such changes.

TSE-6 The project owner shall provide the following notice to the California ISO prior to synchronizing the facility with the California electric transmission system:

A. at least one week prior to synchronizing the facility with the grid for testing, provide the California ISO with a letter stating the proposed date of synchronization; and

B. at least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO's outage coordination department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week before initial synchronization with the grid. The project owner shall contact the California ISO's outage coordination department (Monday through Friday, between the hours of 7:00 a.m. and 3:30 p.m. at (916) 351-2300) at least one business day prior to synchronizing the facility with the grid for testing. A report of that conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California electric transmission system for the first time.

TSE-7 The project owner shall be responsible for inspection of the transmission facilities during and after project construction, and for any subsequent CPM- and CBO-approved changes, to ensure conformance with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards. In cases of non-conformance, the project owner shall inform the CPM and CBO, in writing and within 10 days of the discovery of such non-conformance, and the actions that will be taken to correct it.

Verification: Within 60 days after the 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 charge. A statement verifying conformity with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards;

B. an “as built” engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in charge or an acceptable alternative verification. “As built” drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit, as set forth in the compliance monitoring plan;

C. a summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

California ISO 1998a – California ISO tariff scheduling protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO 1998b – California ISO dispatch protocol posted April 1998.

California ISO 2002a – California ISO Grid Planning Standards, February 2002.

California ISO 2003a - California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March 11, 2003.

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NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2002. NERC/WECC Planning Standards, August 2002.

DEFINITION OF TERMS

AAC — All aluminum conductor.

ACSR — Aluminum conductor steel-reinforced.

ACSS — Aluminum conductor steel-supported.

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) that carries the current.

Congestion Management
A scheduling protocol that ensures dispatched generation and transmission loading (imports) will not violate criteria.

Double Contingency
Also known as emergency or N-2 condition, occurs when a forced outage of two system elements occurs -- usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.

Emergency Overload
See Single Contingency condition. This is also called an N-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 that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

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, divided by 1,000.

Megawatt (MW)
: A unit of power equivalent to 1,341 horsepower.

N-0 Condition
: See Normal Operation/Normal Overload, below.

Normal Operation/ Normal Overload (N-0)
: 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, below.

N-2 Condition
: See Double Contingency, above.

Outlet
: Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities with 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
: A remedial action scheme is an automatic control provision that, as one example, will trip a selected generating unit when a circuit overloads.

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.

Special Protection Scheme/System
: Detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.

Switchyard
: A power plant switchyard is an integral part of a power plant that is used as an outlet for one or more electric generators.

Thermal Rating
: See ampacity.

TSE
: Transmission System Engineering.

Tap
: A transmission configuration that creates an interconnection through a short single circuit to a small or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing
: A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild
: A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

LOCAL SYSTEM EFFECTS

Testimony of Mark Hesters and Ajoy Guha, P.E.

SUMMARY OF CONCLUSIONS

1. The Eastshore project will reduce transmission system losses between 6.5 MW and 19 MW. Over 20 years, the savings to ratepayers would have an estimated present value of between $11.4 million and $16.3 million. In addition to reducing the cost of producing power in California, these savings would also contribute to a related decrease in the consumption of fossil fuels and water, and fewer air emissions by reducing the need for additional generation resources.

2. A primary benefit of the addition of the Eastshore project is that the plant will serve as a local generation facility (in addition to the proposed Russell City Energy Center).

3. The Eastshore project can be reliably connected to the California Independent System Operator (California ISO)-controlled grid with the projects identified in the current transmission plan, and no downstream new or modified facilities are required to accommodate the interconnection of the project.

4. The Eastshore project would increase reactive margins in the southern East Bay area and the San Francisco Peninsula, thereby improving voltage stability and system reliability.

INTRODUCTION

This evaluation was prepared by the California Energy Commission (Energy Commission) staff and provides an analysis of the local electric system effects of the Eastshore Energy Center (Eastshore) generation project along with staff's conclusions regarding these effects. Local system effects are localized electrical benefits and impacts that can be attributed to the addition of a new generator to the electric transmission grid. The effects assessed in this evaluation include: the potential to defer capital investments, the effect on system losses and reactive power margins, and the ability of the Eastshore project to be integrated into the existing and planned system.

The evaluation of local system effects has been included to provide a greater understanding of the effect of the addition of the Eastshore project to the electric grid. Conformance with reliability criteria is addressed in the Transmission System Engineering section of the Final Staff Assessment (FSA).

Generally, there are two ways to deliver power to the southern East Bay area. Power can be produced and distributed locally, or it can be produced remotely and transported into the area over transmission facilities. The amount of power that can be delivered from remote locations is limited by the capacity of transmission facilities serving the area. The Eastshore project, if approved and built, would add as much as 115 megawatts (MW) of real power and 80 megavars (MVAR) of reactive power into the grid, which in turn would help maintain the ability of the Bay Area grid to transport

power[1]As a result, Eastshore plays a key long-term role (along with future transmission upgrades) in the long-term plan as a local generation source in the southern East Bay area. The Eastshore project will also reduce system losses and provide reactive power.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Where appropriate, the authors have utilized Western Electric Coordinating Council (WECC), North American Electric Reliability Council (NERC) and California Independent System Operator (ISO) Planning Standards regarding outages and system reactive margin criteria to assess the benefits or detriments of the Eastshore project.

To assure that energy implications are considered in project decisions, California Environmental Quality Act (CEQA) guidelines require that environmental analyses include a discussion of the potential energy impacts of proposed projects, with a particular emphasis on avoiding or reducing the inefficient, wasteful, and unnecessary consumption of energy. The CEQA guidelines also require that decision makers consider "[t]he effects of the project on local and regional energy supplies and on requirements for additional capacity,…" (CEQA, Appendix F).

SETTING AND AREA RESOURCES

Electricity for the cities of Hayward, Fremont, and San Leandro is supplied primarily from the older Pittsburg and Contra Costa power plants located in the northern East Bay area via the Eastshore substation, as well as from imported power via the Newark, Tesla, and Vaca-Dixon substations through the existing bulk transmission lines, including 500 kV lines. The Eastshore project would interconnect at the 115 kV bus of the existing 230/115kV PG&E Eastshore substation, which is located near the shoreline of the southern East Bay next to the San Mateo Bridge. As a result, power from the Eastshore project would serve the load demands of the cities of Hayward, Fremont and San Leandro in the southern East Bay area through the existing 115 kV network and, to some extent, would also serve the load demands of the city of San Mateo in the San Francisco peninsula area through the San Mateo substation via the Eastshore-San Mateo 230 kV line that runs across the SF Bay over the San Mateo Bridge. Under certain outage conditions, the Eastshore project could be the only major generator providing electricity to the Hayward area.

[1] In general, electric energy is defined as "real power," measured in megawatts,and is used to supply lighting, motors, computers and numerous other appliances. "Reactive power," measured in megavars, supplies voltage support to transport electricity through the transmission system. Real power flow on transmission facilities must not exceed the capacity of transmission facilities. When real power flow is projected to exceed the capability of transmission facilities, steps must be taken to either limit power flow or install additional or higher-capacity equipment. If reactive power is insufficient, system voltages will decrease, which could lead to the controlled dropping of customer loads (rolling blackouts) and even the uncontrolled loss of load associated with voltage collapse.

LOCAL SYSTEM EFFECTS

The following types of local system effects have been reviewed to assess their potential benefits to local generation:

1. **The Effect on Plans for Transmission Facility Upgrades:** Deferral of capital facilities is determined by identifying the proposed facilities for which need is delayed or eliminated because a target generator offsets the need for those facilities. In the case of the City and County of San Francisco, where there has been a public mandate to shut down existing old power plants, a new plant (or plants) could allow the shut down of those plants.

2. **The Effect on System Losses:** Comparing the system both with and without the interconnection and operation of the Eastshore project identifies the decrease or increase in losses.

3. **Impact on Local Capacity Requirement Costs:** Would the proposed project increase or decrease these costs?

4. **Integration into Existing and Planned System:** Would major system additions or modifications be needed to accommodate the new generation facility?

5. **Effect on System Reliability:** Would the project increase or decrease system reliability?

THE EFFECT ON PLANS FOR TRANSMISSION FACILITY UPGRADES

Electricity will be supplied to customers in the SF southern East Bay area either through local generation or through the existing transmission facilities via the San Mateo, Eastshore, Newark, and Tesla substations. Additional generation can reduce the need for additional transmission facilities. But, given the potential retirement of existing generation in the Bay Area, staff is unable to conclude that the Eastshore project will lead to the deferral of any planned transmission facilities.

As a source of local generation, the Eastshore project would be a component of a reliable network and essentially serve local load demands in the cities of Hayward, Fremont, and San Leandro. Over the coming years, the addition of the Eastshore project would probably not defer any identified major transmission facilities.

The California ISO 2007 Annual Transmission plan identified a number of overloads and low voltage situations on the transmission facilities within the greater Bay Area. In addition to the deliverability assessment of resources, a number of deliverability overloads were identified in several parts of the SF Greater Bay Area, some of which have been contributed to by resources located in the North Coast and north Bay Area (Marin, Napa and Sonoma, Lake, and Mendocino Counties). In addition, there are real-time operational and congestion issues in the SF Bay Area. In that respect the Eastshore project would to some extent help reduce congestion and overloads in the Bay Area bulk power system and improve voltage conditions and operation of the system.

THE EFFECT ON SYSTEM LOSSES

Transmission system losses are a function of generation schedules, imports, exports, wheeling, and system loop flow, in addition to load. Transmission line losses occur as a result of conductor resistance and corona discharge. Resistance line losses are significant, especially on long, heavily loaded lines with a high load factor (75-100 percent). Typical values for utility systems in California range from12 kW/mile to 500 kW/mile for line loadings between 25 percent and 100 percent of conductor ratings. Resistance line losses are generally described as I^2R[2] heating dissipation losses. These losses are similar to losses from the operation of electric strip heaters for home and building use, where heat is produced by connecting a resistor heating element across 120V or 240V and allowing the current to flow through the resistor element.

Based on the projected 2008 northern California system summer peak demand of 26,658 MW, the primary system losses (transmission lines and transformers) are approximately 1,040 MW without the Eastshore and Russell City Energy Center (RCEC) plants operating. Transmission losses thus constitute 3.9 percent of the load.

Transmission line losses were assessed separately for the addition of the proposed local plants, first for the addition of the Eastshore project only (115 MW), second for the addition of the RCEC only (600 MW) and third for the combined addition of both the Eastshore and RCEC plants (total 715 MW). The last two loss analyses were performed for comparison purposes. Six alternative plant dispatch scenarios were selected for the addition of the plants to bracket the range of dispatch conditions that occur in an actual year. Because the total power supplied to the system, generation and imports, must equal the system load plus the losses, when either Eastshore or RCEC operates, 115 MW for Eastshore or 600 MW for RCEC, additional generation (as shown by the dispatch scenarios) must be balanced by reducing an equal amount of generation output from some other operating plants in the system or reducing imports to the system. The baseline for comparison was the system losses without the Eastshore and RCEC. Losses with the Eastshore project on line and other units redispatched according to the established dispatch scenarios were then compared with the baseline.

The outputs of the following plants were reduced one at a time as a dispatch scenario in order to balance the addition of Eastshore (115 MW) or the RCEC (600 MW), or the combination of these two, proposed plants (715 MW) for the 2008 study year[3]:

1. Pittsburg Power Plant
2. Delta Energy Center
3. Moss Landing Power Plant
4. Contra Costa Power Plant

[2] Line loss= Square of the Current (I) flowing in the line multiplied by Resistance (R) of the line.

[3] This list of generators represents the generators whose output was reduced to balance the system for the addition of the Eastshore and the RCEC. The real power output from other generators, like the Los Medados Power Plant and others were included in the analysis, but they do not change the scenarios.

5. Hyatt Power Plant (plus Thermalito generation for the RCEC and Eastshore case)

6. Northwest Imports

By adding the Eastshore project and the RCEC, and reducing equal amount of generation at the existing plants or Imports listed above, staff found the following reduction in losses (**See Appendix A, Tables I, III and V**):

1. The Eastshore project would reduce losses between 6.5 MW and 19 MW.

2. The RCEC would reduce losses between 21 MW and 81 MW.

3. The Eastshore project and RCEC together would reduce losses between 21 MW and 100 MW.

Loss savings act as energy that is produced without using additional fuel or water and without producing additional plant emissions.

To estimate annual energy savings, staff assigned probabilities to the various dispatch scenarios tested[4]. Multiplying the unique dispatch-related loss reduction value by the assigned dispatch probability provided an expected overall MW loss reduction value for the study year: 9 MW in 2008 for the Eastshore project by itself, 34 MW for the RCEC by itself, and 41 MW for Eastshore and RCEC together. Therefore, while the Eastshore would produce a loss savings of 9 MW by itself, the Eastshore would produce only 7 MW (41 MW-34 MW) of loss savings for operation of the Eastshore and RCEC together. The estimated annual energy savings corresponding to the expected overall system loss reduction values noted above are 24 GWh for the Eastshore by itself and 18.5 GWh (107.99 GWh-89.49 GWh) for the Eastshore when the Eastshore is considered operating together with RCEC. These energy savings are equivalent to the annual energy consumption of approximately 3,636 (2,803 with RCEC) homes[5]. A reduction in system losses of this magnitude would save ratepayers $1.2 to $1.7 million per year for the Eastshore by itself or $0.9 to $1.3 million per year when the Eastshore project is added to the RCEC. Over a twenty-year period, the present value of these savings to ratepayers is $11.4 to $16.3 million. In calculating these values for the loss savings, the following assumptions were made:

- Natural gas prices are $7/MMBtu;
- The displaced unit's heat rate is 7,000-10,000 Btu/kWh;
- Any emission offsets created are valued at $0 (a very conservative assumption); and
- The rate of return is 8 percent.

The calculations for these analyses are contained in **Appendix A, Tables II, IV and VI** for the study year 2008.

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[4] For the five dispatch scenarios of plants within California staff assigned a .18 weight and for the one dispatch that reduced imports from the northwest staff assigned a .10 weight.

[5] For this estimate staff assumed that an average household in California uses 6,600 KWh of energy annually.

To ensure that energy implications are considered in project decisions, environmental documents must include a discussion of the potential energy impacts of proposed projects. This discussion places particular emphasis on avoiding or reducing inefficient, wasteful, or unnecessary energy consumption and the project's effect on local and regional energy supplies. Most decision makers are generally faced with only negative energy use considerations when approving a project that may result in significant increased use of energy. The Energy Commission faces a different situation because Eastshore will reduce energy losses while providing other benefits. If the assumption is that the Eastshore project, if built, would operate for at least 20 years, there would be long-term environmental benefits relating to reduced fuel and water use and reduced emissions due to the reduction in electricity system losses.

LOCAL CAPACITY REQUIREMENT COSTS

While the Eastshore project would reduce local capacity requirements (LCR) in the Bay Area, staff is unable to identify an increase or decrease of LCR costs due to the addition of the Eastshore project without appropriate costs and other data which were not readily available from other agencies.

INTEGRATION INTO EXISTING AND PLANNED SYSTEM

Based on the various studies from PG&E (Eastshore 2006a and CH2MHILL 2007b), the Eastshore project can be connected to the California ISO-controlled grid with the projects identified in the current transmission plan, assuming several system protection schemes are implemented. There is no evidence that any existing facilities or additional facilities planned for the California ISO-controlled grid through 2008 will need to be modified because of the Eastshore project.

EFFECT ON SYSTEM RELIABILITY

The Eastshore project would provide both real and reactive power to the grid in San Francisco Bay Area. The reactive power margin analysis shows that the additional reactive power output, 80 MVAR, from the Eastshore will increase the local reactive margins even under system contingency conditions (Study results are shown in **Appendix B, Table I**), thereby would improve voltage stability and system reliability.

CONCLUSIONS

1. The Eastshore project would reduce transmission system losses between 6.5 MW and 19 MW. Over 20 years of operation, the savings to ratepayers have a present value of between $11.4 million and $16.3 million. As well as reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in fossil fuel use, water use, and air emissions by reducing the need for additional generation sources.

2. A primary benefit of the Eastshore project is as a local source of generation (in addition to the RCEC plant) that will serve load demands in the cities of Hayward, Fremont, and San Leandro in the southern East Bay area, and also the San Francisco Peninsula because of its unique location near the east shoreline of the San Francisco Bay and its proximity to the existing transmission network. It will also

help reduce overloads, low voltages, and congestion in the SF East Bay Area and may additionally help in real-time operation.

3. While the Eastshore project would reduce local capacity requirements in the SF greater Bay Area, the effects of the Eastshore project upon LCR costs are unknown.

4. The Eastshore project could be connected to the California ISO-controlled grid with the projects identified in the current transmission plan. No new or modified grid facilities are required to accommodate interconnection of the Eastshore project.

5. The Eastshore project would increase reactive margins in the southern East Bay Area and San Francisco Peninsula, thereby improving voltage stability and system reliability.

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CEC Staff Natural Gas Price Forecast, Summer 2006.

NERC/GADS Data for Generic Heat Rates of new generating units.

Energy Information Administration (EIA)/411, or Continuous Emission Monitoring System (CEMS) of EPA for Full Load Heat Rates of the existing generating units.

APPENDIX A

TABLE I

EASTSHORE ENERGY CENTER (EEC) LOSS ANALYSIS-YEAR 2008

TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	EXPECTED PEAK LOSS REDUCTION (MW)	ANNUAL ENERGY SAVED (GWh)	EXPECTED ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak**, Swing = Morro Bay Unit 4. All EEC Units are off line.	1040.20					
Dispatch 1, Local Adjustment : EEC = +115 MW, Piitsburg = -115 MW,		1033.65	6.55	1.18	19.33	3.48
Dispatch 2, Local Adjustment : EEC = +115 MW, Delta Energy= -115 MW..		1033.08	7.12	1.28	21.01	3.78
Dispatch 3, Local Adjustment: EEC = +115 MW, Moss Landing = -115 MW.		1033.17	7.03	1.27	20.74	3.73
Dispatch 4, Local Adjustment: EEC = +115 MW, Contra Costa = -115 MW.		1035.16	5.04	0.91	14.87	2.68
Dispatch 5, Local Adjustment: EEC = +115 MW, Hyatt = -115 MW,		1026.65	13.55	2.44	39.98	7.20
Dispatch 6, Remote Adjustment: EEC = +115 MW, COI= -115 MW,		1021.25	18.95	1.90	55.91	2.80
Totals:				**8.97**		**23.66**
Average:			**9.71**		**28.64**	--

NOTE: Calculations for expected MW Peak loss & Energy savings and related present value in dollars are illustrated in Appendix A, Table II

APPENDIX A
TABLE II

EASTSHORE ENERGY CENTER (EEC) LOSS ANALYSIS-YEAR 2008
TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	PROBABILITY OF THE REDISPATCH SCENAIRIO	EQUIVALENT PEAK LOSS REDUCTION (MW)	SYSTEM ANNUAL LOAD FACTOR	EQUIVALENT HOURS LOSS FACTOR	ANNUAL ENERGY SAVED (GWh)	PROBABLE ANNUAL ENERGY SAVED (GWh)	ADJUSTMENT FACTOR FOR REMOTE DISPATCH	ADJUSTED PROBABLE ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak.** Swing = Morro Bay Unit 4. All fourteen EEC Units are off line.	1040.20										
Dispatch 1, Local Adjustment : EEC =+115 MW, Pittsburg = -115 MW,		1033.65	6.55	0.18	1.18	0.57	0.34	19.33	3.48	1.00	3.48
Dispatch 2, Local Adjustment : EEC= +115 MW, Delta Energy = -115 MW.		1033.08	7.12	0.18	1.28	0.57	0.34	21.01	3.78	1.00	3.78
Dispatch 3, Local Adjustment: EEC = +115 MW, Moss Landing = -115 MW..		1033.17	7.03	0.18	1.27	0.57	0.34	20.74	3.73	1.00	3.73
Dispatch 4, Local Adjustment: EEC = +115 MW, Contra Costa= -115 MW.		1035.16	5.04	0.18	0.91	0.57	0.34	14.87	2.68	1.00	2.68
Dispatch 5, Local Adjustment: EEC = +115 MW, Hyatt = -116 MW.		1026.65	13.55	0.18	2.44	0.57	0.34	39.98	7.20	1.00	7.20
Dispatch 6, Remote Adjustment: EEC = +115 MW, COI= -115 MW.		1021.25	18.95	0.10	1.90	0.57	0.34	55.91	5.59	0.50	2.80
Totals:				**1.00**	**8.97**				**26.46**		**23.66**
Average:			**9.71**					**28.64**			--

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**23.66**		
Cost of Energy ($/MWh)	$49.00	**$7.00**	**7000**
Total Savings per year in 1000 ($)	**$1,159.43**		
Total Savings per year in million ($)	**$1.16**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Present Value of Savings in 1000 ($)	$11,383.42		
Present Value of Savings in million ($)	**$11.38**		

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**23.66**		
Cost of Energy ($/MWh)	$70.00	**$7.00**	**10000**
Tot. Savings per year in 1000 ($)	**$1,656.32**		
Total Savings per year in million ($)	**$1.66**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Pr. Value of Savings in 1000 ($)	$16,262.03		
Pr. Value of Savings in million ($)	**$16.26**		

APPENDIX A

TABLE III

RUSSELL CITY ENERGY CENTER (RCEC) LOSS ANALYSIS-YEAR 2008

TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	EXPECTED PEAK LOSS REDUCTION (MW)	ANNUAL ENERGY SAVED (GWh)	EXPECTED ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak**, Swing = Morro Bay Unit 4. All EEC and RCEC Units are off line.	1040.20					
Dispatch 1, Local Adjustment : RCEC = + 600 MW, Piitsburg = - 600 MW,		1015.76	24.44	4.40	72.11	12.98
Dispatch 2, Local Adjustment : RCEC = +600 MW, Delta Energy= - 600 MW..		1014.68	25.52	4.59	75.30	13.55
Dispatch 3, Local Adjustment: RCEC = +600 MW, Moss Landing = - 600 MW.		1016.50	23.70	4.27	69.93	12.59
Dispatch 4, Local Adjustment: RCEC = + 600 MW, Contra Costa = - 600 MW		1019.16	21.04	3.79	62.08	11.17
Dispatch 5, Local Adjustment: RCEC + + 600 MW, Hyatt= - 600 MW		988.85	51.35	9.24	151.51	27.27
Dispatch 6, Remote Adjustment: RCEC = + 600 MW, COI= -600 MW,		959.36	80.84	8.08	238.51	11.93
				34.37		**89.49**
Average:			**37.82**		**111.57**	--

NOTE: Calculations for expected MW Peak loss & Energy savings and related present value in dollars are illustrated in Appendix A, Table IV.

APPENDIX A
TABLE IV

RUSSELL CITY ENERGY CENTER (RCEC) LOSS ANALYSIS-YEAR 2008
TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	PROBABILITY OF THE REDISPATCH SCENAIRIO	EQUIVALENT PEAK LOSS REDUCTION (MW)	SYSTEM ANNUAL LOAD FACTOR	EQUIVALENT HOURS LOSS FACTOR	ANNUAL ENERGY SAVED (GWh)	PROBABLE ANNUAL ENERGY SAVED (GWh)	ADJUSTMENT FACTOR FOR REMOTE DISPATCH	ADJUSTED PROBABLE ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak.** Swing = Morro Bay Unit 4. All EEC Units and RCEC Units are off line.	1040.20										
Dispatch 1, Local Adjustment : RCEC = +600 MW, Pittsburg = - 600 MW,		1015.76	24.44	0.18	4.40	0.57	0.34	72.11	12.98	1.00	12.98
Dispatch 2, Local Adjustment : RCEC = + 600 MW, Delta Energy = - 600 MW.		1014.68	25.52	0.18	4.59	0.57	0.34	75.30	13.55	1.00	13.55
Dispatch 3, Local Adjustment: RCEC = + 600 MW, Moss Landing = - 600 MW..		1016.50	23.70	0.18	4.27	0.57	0.34	69.93	12.59	1.00	12.59
Dispatch 4, Local Adjustment: RCEC = + 600 MW, Contra Costa= - 600 MW		1019.16	21.04	0.18	3.79	0.57	0.34	62.08	11.17	1.00	11.17
Dispatch 5, Local Adjustment: RCEC = + 600 MW, Hyatt = - 600 MW.		988.85	51.35	0.18	9.24	0.57	0.34	151.51	27.27	1.00	27.27
Dispatch 6, Remote Adjustment: RCEC = + 600 MW, COI= - 600 MW.		959.36	80.84	0.10	8.08	0.57	0.34	238.51	23.85	0.50	11.93
Totals:				**1.00**	**34.37**				**101.42**		**89.49**
Average:			**37.82**					**111.57**			--

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**89.49**		
Cost of Energy ($/MWh)	$49.00	**$7.00**	**7000**
Total Savings per year in 1000 ($)	**$4,385.02**		
Total Savings per year in million ($)	**$4.39**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Present Value of Savings in 1000 ($)	$43,052.81		
Present Value of Savings in million ($)	**$43.05**		

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**89.49**		
Cost of Energy ($/MWh)	$70.00	**$7.00**	**10000**
Tot. Savings per year in 1000 ($)	**$6,264.32**		
Total Savings per year in million ($)	**$6.26**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Pr. Value of Savings in 1000 ($)	$61,504.01		
Pr. Value of Savings in million ($)	**$61.50**		

APPENDIX A

TABLE V

EASTSHORE ENERGY CENTER (EEC) AND RUSSELL CITY ENERGY CENTER (RCEC) LOSS ANALYSIS-YEAR 2008
TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	EXPECTED PEAK LOSS REDUCTION (MW)	ANNUAL ENERGY SAVED (GWh)	EXPECTED ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak**, Swing = Morro Bay Unit 4. All EEC and RCEC Units are off line.	1040.20					
Dispatch 1, Local Adjustment : EEC = +115 MW, RCEC = + 600 MW, Piitsburg = - 715 MW,		1011.16	29.04	5.23	85.68	15.42
Dispatch 2, Local Adjustment : EEC = +115 MW, RCEC = +660 MW, Delta Energy= - 715 MW..		1009.87	30.33	5.46	89.49	16.11
Dispatch 3, Local Adjustment: EEC = +115 MW, RCEC = +660 MW, Moss Landing = - 715 MW.		1007.33	32.87	5.92	96.98	17.46
Dispatch 4, Local Adjustment: EEC = +115 MW, RCEC = + 600 MW, Contra Costa = - 715 MW.		1019.27	20.93	3.77	61.75	11.12
Dispatch 5, Local Adjustment: EEC = +115 MW, RCEC + + 600 MW, Hyatt= - 642 MW, Thermal=-73 MW.		977.85	62.35	11.22	183.96	33.11
Dispatch 6, Remote Adjustment: EEC = +115 MW, RCEC = + 600 MW, COI= - 715 MW,		940.02	100.18	10.02	295.58	14.78
Totals:				**41.61**		**107.99**
Average:			**45.95**		**135.57**	--

NOTE: Calculations for expected MW Peak loss & Energy savings and related present value in dollars are illustrated in Apendix A, Table VI.

APPENDIX A
TABLE VI

EASTSHORE ENERGY CENTER (EEC) AND RUSSELL CITY ENERGY CENTER (RCEC) LOSS ANALYSIS-YEAR 2008
TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	PROBABILITY OF THE REDISPATCH SCENAIRIO	EQUIVALENT PEAK LOSS REDUCTION (MW)	SYSTEM ANNUAL LOAD FACTOR	EQUIVALENT HOURS LOSS FACTOR	ANNUAL ENERGY SAVED (GWh)	PROBABLE ANNUAL ENERGY SAVED (GWh)	ADJUSTMENT FACTOR FOR REMOTE DISPATCH	ADJUSTED PROBABLE ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment **2008 Summer Peak.** Swing = Morro Bay Unit 4. All EEC Units and RCEC Units are off line.	1040.20										
Dispatch 1, Local Adjustment : EEC =+115 MW, RCEC = +600 MW, Pittsburg = - 715 MW,		1011.16	29.04	0.18	5.23	0.57	0.34	85.68	15.42	1.00	15.42
Dispatch 2, Local Adjustment : EEC= +115 MW, RCEC = + 600 MW, Delta Energy = - 715 MW.		1009.87	30.33	0.18	5.46	0.57	0.34	89.49	16.11	1.00	16.11
Dispatch 3, Local Adjustment: EEC = +115 MW, RCEC = + 600 MW, Moss Landing = - 715 MW..		1007.33	32.87	0.18	5.92	0.57	0.34	96.98	17.46	1.00	17.46
Dispatch 4, Local Adjustment: EEC = +115 MW, RCEC = + 600 MW, Contra Costa= - 715 MW.		1019.27	20.93	0.18	3.77	0.57	0.34	61.75	11.12	1.00	11.12
Dispatch 5, Local Adjustment: EEC = +115 MW, RCEC = + 660 MW, Hyatt = - 642 MW, Thermal= - 73 MW.		977.85	62.35	0.18	11.22	0.57	0.34	183.96	33.11	1.00	33.11
Dispatch 6, Remote Adjustment: EEC = +115 MW, RCEC = + 600 MW, COI= - 715 MW.		940.02	100.18	0.10	10.02	0.57	0.34	295.58	29.56	0.50	14.78
Totals:				**1.00**	**41.61**				**122.77**		**107.99**
Average:			**45.95**					**135.57**			--

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**107.99**		
Cost of Energy ($/MWh)	$49.00	**$7.00**	**7000**
Total Savings per year in 1000 ($)	**$5,291.72**		
Total Savings per year in million ($)	**$5.29**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Present Value of Savings in 1000 ($)	$51,954.92		
Present Value of Savings in million ($)	**$51.95**		

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**107.99**		
Cost of Energy ($/MWh)	$70.00	**$7.00**	**10000**
Tot. Savings per year in 1000 ($)	**$7,559.60**		
Total Savings per year in million ($)	**$7.56**		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Pr. Value of Savings in 1000 ($)	$74,221.32		
Pr. Value of Savings in million ($)	**$74.22**		

APPENDIX B
Eastshore Energy Center (EEC)
TABLES FOR REACTIVE POWER MARGIN
(With 80 MVAR SVC at Potrero Plant)

N-1 Contingency Case: Dumbarton - Newark D 115 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without EEP Units (MVAR)	'Nose-Point' with EEP Units (MVAR)	+/- Change in Bus Reactive Power Margin (MVAR)
Year 2008 Summer Peak	Grant 115 kV	-373	-425	+52
	Dumbarton 115 kV	-310	-354	+44
	San Mateo 230 kV	-1199	-1285	+86
	Martin C 115 kV	-765	-803	+38

N-2 Contingency Case: Pittsburg – Eastshore 230 kV Line and Eastshore- San Mateo 230 kV Line

Load Flow Scenario	MONITORED BUS	'Nose-Point' without EEP Units (MVAR)	'Nose-Point' with EEP units (MVAR)	+/- Change In Bus Reactive Power Margin (MVAR)
Year 2008 Summer Peak	Grant 115 kV	-177	-249	+72
	Dumbarton 115 kV	-305	-398	+93
	San Mateo 230 kV	-1022	-1091	+69
	Martin C 115 kV	-688	-719	+31

N-2 Contingency Case: Dumbarton - Newark D 115 kV Line and Pittsburg – Eastshore 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without EEP Units (MVAR)	'Nose-Point' with SFERP Units (MVAR)	+/- Change in Bus Reactive Power Margin (MVAR)
Year 2008 Summer Peak	Grant 115 kV	-289	-349	+60
	Dumbarton 115 kV	-247	-299	+52
	San Mateo 230 kV	-909	-1043	+134
	Martin C 115 kV	-637	-703	+66

APPENDIX B
Eastshore Energy Center (EEC)
TABLES FOR REACTIVE POWER MARGIN
(With 80 MVAR SVC at Potrero Plant)

N-1 Contingency Case: San Mateo – Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without EEP Units (MVAR)	'Nose-Point' with SFERP Units (MVAR)	+/- Change in Bus Reactive Power Margin (MVAR)
Year 2008 Summer Peak	Grant 115 kV	-495	-542	+47
	Dumbarton 115 kV	-649	-694	+45
	San Mateo 230 kV	-1130	-1197	+67
	Martin C 115 kV	-643	-669	+26

N-2 Contingency Case: San Mateo – Martin C 230 kV Line and Jefferson – Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without EEP Units (MVAR)	'Nose-Point' with SFERP Units (MVAR)	+/- Change in Bus Reactive Power Margin (MVAR)
Year 2008 Summer Peak	Grant 115 kV	-447	-497	+50
	Dumbarton 115 kV	-584	-635	+51
	San Mateo 230 kV	-685	-752	+67
	Martin C 115 kV	-363	-389	+26

ALTERNATIVES

Testimony of Suzanne Phinney, D.Env.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Eastshore Energy Center (Eastshore). The purpose of this alternatives analysis is to comply with State environmental laws by providing an analysis of a reasonable range of feasible alternative sites which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765). This section identifies potentially significant impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by locating the project at alternative sites.

The Energy Commission does not have the authority to approve an alternative or require Eastshore to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of any significant effects of the project. Eastshore has executed a contract with Pacific Gas and Electric Company (PG&E) that requires the delivery of II5.5 MW of electric supply capacity to PG&E's Eastshore Substation by May 2009. In order to meet that contract, the applicant has stated that Energy Commission certification would be needed by the end of 2007 (DBA 2007c, p1-2). Implementation of an alternative site would require that the applicant submit a new Application for Certification (AFC), including revised engineering and environmental analysis; this more rigorous AFC-level analysis of any of the alternative sites could reveal environmental impacts, non-conformity with laws, ordinances, regulations, and standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein. Eastshore has stated that an alternative site location would constitute the "no project" alternative.

CALIFORNIA ENVIRONMENTAL QUALITY ACT CRITERIA

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

The range of alternatives is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. CEQA states that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6(f)(3)).

PROJECT DESCRIPTION AND SETTING

Eastshore is designed as a 115.5 MW nominal capacity intermediate/peaking load facility which has been proposed to provide local reliability for the greater Bay Area in addition to voltage support to the regional 230 kilovolt (kV) transmission system during both peak demand hours and when other generation is not available. As described in the AFC, Eastshore's quick start capability is designed to respond to unexpected changes in regional demands from higher-than-expected summer temperatures, other facilities tripping off line, or sudden changes in renewable power generation, such as wind.

Eastshore was selected by PG&E through its 2004 Request for Offers (RFO) for new non-renewable generation resources. (A separate solicitation process is conducted for PG&E's procurement of renewable resources.) The Eastshore project was one of seven selected projects and was ultimately chosen over others because of its location within an area needing 230-kV voltage support. It will also service local loads currently fed from PG&E's 115-kV distribution system, reducing inefficiencies from importing power on the 230-kV transmission system which must then be stepped down to 115 kV to service local loads.

The proposed Eastshore site is a 6.22-acre parcel located at 25101 Clawiter Road in the city of Hayward, Alameda County, in an area zoned for industrial use. Eastshore would be connected to PG&E's electrical system at the utility's existing Eastshore substation, which is located approximately 1.1 miles south of the proposed Eastshore site. This connection would require a new overhead single circuit 115- kV line that will run near an existing PG&E 12-kV distribution corridor. Natural gas would be supplied to the proposed Eastshore Project via a 200-foot pipeline connection to PG&E's Pipeline 153, which is on the opposite side of Clawiter Road from the proposed project. Eastshore would use approximately 1.6 acre-feet of potable water per year, which would be supplied by the city of Hayward through an existing connection immediately adjacent to the proposed site. Sanitary wastewater would be discharged to Hayward's city sewer system via an existing on-site sewer connection. The closest noise receptors are located approximately 1,100 feet east of the site and a school (Life Chiropractic College West) is located approximately 1000 feet from the site. Ochoa Middle School, the closest public school, is located approximately one-half mile east of the site.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to determine the potential significant impacts of the Eastshore project and then focus on alternatives that are capable of reducing or avoiding these impacts.

To prepare this alternative analysis, the staff used the methodology summarized below:

- Describe the basic objectives of the project.
- Identify any potential significant environmental impacts of the project.

- Identify and evaluate alternative locations or sites to determine whether the environmental impacts of the alternatives are the same, better, or worse than the proposed project.
- Identify and evaluate technology alternatives to the project which would mitigate impacts.
- Evaluate the impacts of not constructing the project to determine whether the “no project” alternative is superior to the project as proposed.

In considering site alternatives, staff determined a reasonable geographical area. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for site alternatives to the East San Francisco Bay Area. These location alternatives are generally consistent with Eastshore’s project objectives and siting criteria: proximity to the PG&E Eastshore Substation; location in an area appropriate for industrial development and compatible with city general plans and zoning ordinances; proximity to water service connections and PG&E transmission line and gas pipeline; and ability to have no significant impact on the environment with implementation of reasonable mitigation measures.

Alternative generation technologies, as discussed in this analysis, include both methods to reduce the demand for electricity and also alternative methods to generate electricity.

There may also be specific technologies that could be applied to the Eastshore Project that would reduce impacts of the project. For example, staff has determined that the use of oxidizing soot filters is a viable emissions control technology for all heavy diesel-powered construction equipment that does not use an ARB-certified low emission diesel engine. The in-depth discussion of such technology alternatives is included in the technical area chapters of the Final Staff Assessment (FSA), where appropriate.

BASIC OBJECTIVES OF THE PROJECT

After studying Eastshore’s AFC, Energy Commission staff has determined Eastshore Energy Center’s objectives to be:

- To safely construct and operate a nominal 115.5 MW(net), natural-gas-fired, intermediate/peaking load generating facility;
- To deliver electricity to the PG&E Eastshore Substation at 115 kV without the need for system upgrades; and
- To provide voltage support to the regional 230 kV transmission system.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

The Eastshore project site is approximately 1 mile southwest of the Hayward Executive Airport and would be within the city of Hayward Airport Approach Zoning Plan boundaries and Airport Influence Area (Hazard Protection Zone), as identified in the Alameda County Airport Land Use Policy Plan. These boundaries extend approximately two to three miles out from the landing area of the airport.

Staff has determined that siting of the proposed Eastshore project would result in significant adverse direct, indirect and cumulative impacts to aviation safety and air traffic patterns, and the utility of the Hayward Executive Airport and the surrounding airspace that cannot be avoided or mitigated if the project is implemented at the proposed location, or anywhere within the airspace of the Hayward Executive Airport. In addition, the project does not conform with the purpose of the City of Hayward Airport Approach Zoning regulations. It is also inconsistent with the intent of the Alameda County Airport Land Use Policy Plan to promote orderly expansion of airports and land uses compatible with the airport operations and the safe, efficient use of an airport's airspace. The only other municipal airport in the vicinity of the alternative sites is in Palo Alto. The discussion of each alternative site identifies whether aviation safety and air traffic impacts would occur and whether other significant impacts could occur.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates the alternative sites identified by Eastshore (Tierra Energy) and other site possibilities identified by staff or the public.

Staff considered the following criteria in identifying potential alternative sites:

1. Avoid or substantially lessen one or more of the potential significant effects of the project;

2. Satisfy the following criteria:

    a. Site suitability. Approximately 6+ acres are required for the site. The shape of the site also affects its usability;

    b. Availability of infrastructure. The site should be within a reasonable distance of the electric transmission system, natural gas supply, and water supply. Longer infrastructure lengths would increase the potential for environmental impacts;

    c. Not located in proximity to moderate or high density residential areas or to sensitive receptors (such as schools and hospitals) or to recreation area;

    d. Compliance with general plan designation and zoning district; and

    e. Availability of the site.

Staff began by identifying an initial study region. The region consisted of the geographic area near the PG&E Eastshore Substation. Staff chose this region to determine whether alternative sites (in addition to those identified by Eastshore) were close enough to PG&E's Eastshore Substation to provide power to that substation, similar to the proposed project. Staff also expanded the study region to the greater East Bay area, particularly in response to the concerns of Hayward citizens regarding the potential for multiple power plants in their city. The Energy Commission's analysis of local system effects of the Eastshore project indicates that this project would serve load demands in the East Bay cities of Hayward, Fremont and San Leandro as well as the city of San Mateo on the west side of the Bay (see **Local System Effects**). A similar project connecting to the San Mateo Substation would not provide the same reliability benefits

to the East Bay cities. Therefore, staff focused its assessment of alternative sites on the East Bay region.

To narrow the search, staff identified possible alternative sites that had been proposed in connection with other power plants applying for Energy Commission certification. Staff visited these sites to confirm their suitability and continued availability. Staff also did a drive-by search, looking for sites for lease or sale (both vacant parcels and those with buildings). Local realtors were consulted as well. Suggestions by the public for alternative sites were also investigated.

Staff found that potential sites that could meet staff's criteria are rare. Much of the land in the study area has been developed or is in the process of being developed for residential or commercial/light industrial use. Plans, policies, and ordinances of many local governments in the area either prohibit heavy industry (such as a power plant), discourage new heavy industrial facilities in areas currently devoted to heavy industry, or discourage expansion of heavy industry into areas where it is not currently the predominant land use.

SITES INITIALLY IDENTIFIED FOR FURTHER EVALUATION

Staff examined the six site location alternatives proposed in the Eastshore AFC: Tierra Alternative Sites 1, 2, 3, 4, 5, and 6 **(**EEC 2006a, Figure 9.3-1). The alternative sites are located in the general area of the proposed Eastshore site and share some common attributes. Four additional sites in the city of Fremont and one site in the city of Newark were identified: Staff Alternative Sites A, B, C, D and E. Staff also investigated the potential for alternative sites at the former Alameda Naval Air Station.

Sites not Meeting Screening Criteria

A number of potential sites were investigated but rejected for a variety of reasons. These sites are as follows:

A site identified in the Eastshore AFC, Alternative Site 3 (Tierra Alt. #3), located near the Eastshore substation behind 3664 Depot Road in the city of Hayward is a 3.58 acre site. Since the proposed project requires a minimum of 6.22 acres, Tierra Alt. #3 is not a feasible alternative for the Eastshore project and has been eliminated from consideration.

An Eastshore AFC-identified site, Alternative Site 4 (Tierra Alt. #4), is located near the Eastshore substation at 26599 Corporate Avenue in the city of Hayward, California. This site is only 4.4 acres which is 1.82 acres smaller than the required 6.22 acres for the proposed project. Therefore, Tierra Alt. #4 is not a feasible alternative to the Eastshore project and will not undergo further consideration.

The Eastshore AFC identified Alternative Site 6 adjacent to the city of Hayward Water Pollution Control Facility at 3700 Enterprise Avenue (Tierra Alt. #6); however, this site is part of the Russell City Energy Center Amendment #1. Therefore, this site is no longer available for Eastshore.

The Energy Commission's Eastshore Project Siting Committee directed staff to consider input from the Russell City proponent regarding the feasibility of one site (Eastshore

Committee Alt. #1) for both the Eastshore and Russell City projects, potential cumulative impacts of two sites, alternative interconnection locations, and any other relevant information. (Note that Eastshore Committee Alt. #1 includes Tierra Alt. #6 and adjacent land referenced by the city of Hayward, below).

The Energy Commission sent letters to Calpine and the city of Hayward asking for input per the Committee request. No response was submitted by Calpine, although Eastshore indicated that its response, discussed immediately below, was coordinated with Calpine/Russell City. In response to the Siting Committee request, Eastshore provided written comments (DBA 2007c) stating that there are only 2.3 acres of available land on the RCEC site and this acreage is not adequate for the Eastshore project. Eastshore has also identified infrastructure changes that may be necessary (size of gas pipeline, water supply), delays that would be associated with co-location, potential environmental effects (traffic, noise, visual) that could result from co-location and a comparison of environmental impacts of the two sites.

The city of Hayward responded that city-owned property (5.3 acres) in close proximity to the Russell City project site would be used by the RCEC project owner for storage of construction material and equipment or as a parking lot while RCEC is under construction (COH 2007e). Because of the contractual obligations to RCEC and Tierra's previous assertions that this site is too small and that the dimensions of the parcel are inadequate for its needs, the city of Hayward has stated that the property would not be available for use by Eastshore. Based on these considerations, staff has eliminated this site from further consideration.

In its site reconnaissance of the project region, staff identified a property located in Fremont, Alameda County, near the western end of Stevenson Road (Staff Alt. A). Subsequent discussion with NAIBT Commercial indicated that there was a pending sale on the property which made it unavailable. Staff did not pursue this site further since two alternative sites in Fremont were already being evaluated.

Staff investigated a property associated with the Cargill facility located off Central Avenue in Newark, Alameda County, at the Cargill Corporation's salt processing complex (Staff Alt. B). The site was eliminated from further consideration because considerable commercial/office space development has been recently built in the immediate vicinity of this property, with commercial the dominant use rather than industrial.

Staff investigated the availability of sites at the former Alameda Naval Air Station at Alameda Point, in the city of Alameda (Staff Alt. C). In July 2007, the Alameda Reuse and Redevelopment Authority Board approved entering into an exclusive negotiating agreement with SunCal Companies to redevelop the 770-acre site as one of the Bay Area's most significant mixed-use waterfront communities. About 1.6 million square feet of commercial/industrial space, and nearly 2,000 housing units are envisioned. The General Plan for Alameda Point identifies future industrial use as light industry, marine-related industry and research and development.

In 2004, Alameda Power and Telecom (P&T) investigated options for its projected power needs. Both municipal solid waste gasification and combined cycle natural gas

facilities were evaluated; the municipal solid waste option was recommended based, in part, on its renewable resource attributes. Currently, 80 percent of the Alameda P&T energy supply is derived from renewable resources. In 2007, Alameda P&T staff prepared a Greenhouse Gas Reduction Action Plan that recommended that renewable resources be investigated for future power needs. Therefore, locating the Eastshore Project at Alameda Point appears to be inconsistent with the plan for this future community and with the future power plans of Alameda P&T.

Sites Meeting Screening Criteria

A discussion of those sites which generally meet the screening criteria is provided below. These sites are identified in **Alternatives Figure 1**. All of the identified sites are potentially available with the exception of Tierra Alternative Site 1. This site is located on the PG&E-owned Eastshore substation property and although this site may have advantages over the proposed site, PG&E has indicated that it will not enter into a contract with Eastshore to allow private development at this site (DBA 2007d, WKS-2). However, because of the interest PG&E has in the Eastshore project, this site was retained for further analysis.

The Alternative Sites include three of the six sites identified in the Eastshore AFC: Tierra Alternative Sites 1, 2 and 5. As noted above, Tierra Alternative Sites 3, 4 and 6 were eliminated from further analysis. Two additional sites identified by Staff are also discussed below: Staff Alternative Sites D and E. These additional sites would generally meet the screening criteria, but would not meet the project objective of interconnection with the Eastshore Substation. As noted above, Staff Alternative Sites A, B and C were eliminated from further analysis.

Tierra Alternative Site 1

Tierra Alternative Site 1 (Tierra Alt. #1) is located approximately one mile south of the proposed site in an industrial zoned corridor of the city of Hayward. Six to 10 acres (total available acreage is just under 15 acres) of this PG&E-owned land adjacent to Eastshore substation would be needed for the Eastshore Project. Eastshore identified an encumbrance on the site but did not indicate whether it would preclude development of the project (EEC 2006a, Table 9.4-1).This site would require construction of a new switch yard and a 200-foot transmission line to connect to the Eastshore substation. Installation of an approximately 2,000-foot pipeline would be required in order to connect with PG&E's gas pipeline 153. Pipelines would need to be installed in order to connect with the existing potable water and sewer adjacent to the site. The closest noise receptors are located approximately 2,200 feet east of the site and a school is located approximately 4,400 feet east of the site.

As compared to the proposed site, Tierra Alt. #1 would require a much shorter transmission line connection to PG&E's Eastshore substation but a significantly longer pipeline to tap into PG&E's natural gas pipeline. Similar to the proposed site, Tierra Alt. #1 would require installation of pipelines to connect to the existing potable water and sewer lines adjacent to the site. The closest noise receptors are approximately 1,100 feet farther away at this site as compared to the proposed site. The distance to public schools would be about the same. Tierra Alt. #1 would be within two miles of the Hayward Executive Airport. This location could result in significant adverse direct,

indirect and cumulative impacts to aviation safety and air traffic patterns, and the utility of the Hayward Executive Airport and the surrounding airspace However, the location is south of Highway 92 and so is farther removed from airport operations and arrival/departure paths, which could reduce the potential aviation safety and air traffic impacts.

Tierra Alternative Site 2

Tierra Alternative Site 2 (Tierra Alt. #2) is located approximately 3,600 feet west of the proposed site at, 3862 Depot Road, on an 8.72 acre industrial zoned private property currently used as a pallet yard. The Applicant indicated that this site was under a purchase/lease agreement with another party during its initial review of alternative sites. However, the site is still operating as a pallet yard and, as such, may potentially be available for sale or lease. Construction of a new switch yard and 5,000 foot transmission line would be necessary in order to connect to the existing 115 kV transmission corridor along Clawiter Avenue to the Eastshore Substation. To connect to PG&E's natural gas pipeline 153, approximately 4,500 feet away, a new pipeline would have to cross the Union Pacific Railroad ROW. Potable water and sewer exist adjacent to the site; however, new pipeline connections would be required. The closest noise receptors to this site are approximately 1.4 miles from the site and a school is located approximately 1 mile away.

When compared to the proposed site, Tierra Alt. #2 would require construction of a slightly shorter transmission line and a significantly longer gas pipeline. Similar to the proposed site, Tierra Alt. #2 would require pipelines to tap into the potable water and sewer lines adjacent to the site. The closest noise receptors are approximately 6,300 feet further away than at the proposed site. The closest school is twice the distance. Tierra Alt. #2 would be within two miles of the Hayward Executive Airport, at a similar distance to the airport as the proposed site. (Tierra Alt. #2 is north of State Route (SR) 92 while Tierra Alt. #1 and Tierra Alt. #5 are south of SR 92 – see **Alternatives Figure 1**). Because of the proximity to the airport, this location would result in significant adverse direct, indirect and cumulative impacts to aviation safety and air traffic patterns and the utility of the Hayward Executive Airport and the surrounding airspace. Therefore, potential aviation safety and air traffic impacts would be similar to the proposed project.

Tierra Alternative Site 5

Tierra Alternative Site 5 (Tierra Alt. #5) is located near the Eastshore substation at 26460 – 26464 Corporate Avenue in the city of Hayward, California. This site is currently owned by Rees Hayward, LLC. Tierra Alt. #5 is a 12.4 acre site which is zoned industrial. The site would require construction of a new switchyard and construction of a 1,600-foot transmission line to connect to the existing 115 kV transmission line corridor along Clawiter Avenue connecting to the Eastshore Substation. A 400-foot pipeline connection to PG&E's natural gas pipeline 153 within the Union Pacific Railroad ROW would be required. Tierra Alt. #5 has potable water and sewer service; however, an upgrade may be necessary in order to supply the appropriate amount of service needed at the site. In addition, buildings would need to be demolished and the site would have to be cleared of all debris and re-graded in order to accommodate a power plant. The

closest noise receptors to this site are 1,100 feet away. A school is located approximately 2,900 feet from the site.

Tierra Alt. #5 would require construction of a much shorter transmission line and a slightly longer gas pipeline as compared to the proposed site. As with the proposed site, pipeline would be required to connect to the potable water and sewer lines adjacent to the site. The closest noise receptors at Tierra Alt. #5 are at approximately the same distance as the proposed site while the nearest public school is about 500 feet closer. Tierra Alt. #5 would be within two miles of the Hayward Executive Airport. Project operations could result in significant adverse direct, indirect and cumulative impacts to aviation safety and air traffic patterns, and the utility of the Hayward Executive Airport and the surrounding airspace. However, this site location is south of SR 92 and so is farther removed from airport operations and arrival/departure paths, which could reduce the potential aviation safety and air traffic impacts.

Staff Alternative Site D

Staff Alternative Site D (Staff Alt. D) is located at 41100 Boyce Road in Fremont, Alameda County. Staff Alt. D is currently owned by the Borden Chemical Company. A chemical facility, which includes an existing 0.2 MW power plant, occupies part of the site. Ten acres are available for development. The property is currently designated General Industrial. Along the southern boundary are an active railroad spur and electric transmission line. Although the city of Fremont limits building height to 40 feet (warehouses are allowed to a height of 60 feet), Sec. 8-22201 of the Municipal Code states that height limitations shall not apply to “smokestacks” as well as a number of other structures, including distribution and transmission lines.

The Newark Substation is located approximately 0.6 miles from the site. One possible electrical transmission interconnection route to the substation would be overhead for approximately three miles, first along a corridor that contains an existing 115kV transmission line, then along another corridor that contains two 230 kV transmission lines and one 115 kV transmission line. A second possible route would be underground for approximately two miles in city streets. Staff Alt. D would require construction of a 1.3 mile gas pipeline and connection to the adjacent potable water pipeline. The site is located on a major thoroughfare and is about 1,200 feet from the nearest residence. Three schools are located between two-thirds of a mile and one mile of Staff Alt. D.

Staff Alt. D would require the construction of a transmission line two to three times the length of the transmission line required for the proposed site. A much longer gas line would be needed. Distances to sensitive receptors and schools are similar. Staff Alt. D would be visible to recreational users on the proposed Bay Trail route along Boyce Road. However, given its industrial setting, significant visual impacts are not expected. Due to the distance from both the Hayward and Palo Alto Municipal Airports, aviation safety and air traffic impacts would be reduced as compared to the Eastshore project.

Staff Alternative Site E

Staff Alternative Site E (Staff Alt. E) is northwest of the intersection of Grimmer Boulevard and Old Warm Springs Boulevard in the city of Fremont. The site consists of two parcels totaling 20.66 acres. The site is flat and vacant. Surrounding land uses are

primarily industrial and commercial. The Bay Area Rapid Transit Warm Springs Station Site is east and south of Staff Alt. E. A new transmission line would connect the site to the existing PG&E Newark Substation approximately 3.5 miles away. PG&E high pressure natural gas lines are adjacent to the site. Potable water and sewer lines are also adjacent to the site. Sensitive receptors would be located about 0.5 to 0.75 miles from the site and a school is located about 4,500 feet from the site.

Staff Alt. E was one of three sites evaluated in an Environmental Impact Report (EIR) as a potential transfer station, one of several options for dealing with waste by the city of Fremont (Fremont 2000). The City Council certified the EIR in January 2001, with the preferred site located on Boscell Road. Ultimately, that site was deemed unsuitable and a new EIR was prepared and certified with the proposed waste transfer location at 41149 Boyce Road.

A substantially longer transmission line connection would be required as compared to the proposed site. The gas pipeline connection would be much shorter. Water and sewer connections would be the same. Distances to sensitive receptors and schools would be greater. This site would not be expected to create significant visual impacts, even though the nearby BART line and station would be elevated and would likely have future views of the site. Road widening would be needed on Old Warm Springs Road north of Grimmer Boulevard to reduce traffic delays that may result from use of the site. Due to the distance from both the Hayward and Palo Alto Municipal Airports, aviation safety and air traffic impacts would be reduced as compared to the Eastshore project.

Alternatives Table 1 compares the approximate lengths of linears (transmission line, gas pipeline, water and sewer lines) required for the proposed and the five alternative sites. The distances to sensitive receptors and schools are also shown.

Alternatives Table 2 shows whether impacts of the five alternative sites are less than, similar to, or greater than for the Eastshore Project site.

ALTERNATIVES Table 1
Comparison of Approximate Length of Linears/Distance to Receptors (feet)

	Eastshore Site	Tierra Alternative Site 1	Tierra Alternative Site 2	Tierra Alternative Site 5	Staff Alternative Site D	Staff Alternative Site E
Transmission Line Length	5,900	200	5,000	1,600	10,000-15,000	18,500
Gas Pipeline Length	200	2,000	4,500	400	6,800	Adjacent
Water/Sewer Connections	Adjacent	Adjacent	Adjacent	Adjacent	Adjacent	Adjacent
Distance to Sensitive Receptors	1,100	2,200	7,400	1,100	1,200	2,600
Distance to Schools	1,000 – 3,700	4,400	7,000	2,900	3,500	4,500

ALTERNATIVES Table 2
Comparison of Impacts of Alternatives to the Proposed Eastshore Project *

Issue Area	Tierra Alternative Site 1 – PG&E Sub	Tierra Alternative Site 2 – Depot Rd	Tierra Alternative Site 5 – Corporate Ave	Staff Alternative Site D – Boyce Rd	Staff Alternative Site E – Grimmer Blvd
Environmental Assessment					
Air Quality	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Biological Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Cultural Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Hazardous Materials	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Land Use	Similar to proposed site although greater distance to airport could reduce impacts	Similar to proposed site	Similar to proposed site although greater distance to airport could reduce impacts	Less than proposed site	Less than proposed site
Noise and Vibration	Similar to proposed site	Less than proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Public Health	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Socio-economic Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Soil and Water Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Traffic and Transportation	Less than proposed site although aviation safety and air traffic impacts could still occur	Similar to proposed site	Less than proposed site although aviation safety and air traffic impacts could still occur	Less than proposed site	Less than proposed site
Visual Resources	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Waste Management	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Worker Safety	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Engineering Assessment					
Geology, Mineral Resources, and Paleontology	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site
Transmission System Engineering	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site	Similar to proposed site

*Shaded cells identify impacts greater or less than the proposed project

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND SIDE MANAGEMENT

One alternative to meeting California's electricity demand with new generation is to reduce that demand for electricity. Such "demand side" measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand.

In California there is a considerable array of demand side programs. At the federal level, the Department of Energy adopts national standards for appliance efficiency and building standards to reduce the use of energy in federal buildings and at military bases.

At the state level, the Energy Commission adopts comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to federal appliance standards, and load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program.

The California Public Utilities Commission, along with the Energy Commission, oversees investor-owned utility demand side management programs financed by the utilities and its ratepayers. At the local level, many municipal utilities administer demand side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, several local governments have adopted building standards which exceed the state standards for building efficiency, or have by ordinance set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power through a single fuel source or a common source may supply heating and/or heating and cooling to a number of adjacent buildings, increasing overall efficiency.

Even with this great variety of federal, state, and local demand side management programs, the state's electricity use is still increasing as a result of population growth and business expansion. Current demand side programs are not sufficient to satisfy future electricity needs, nor is it likely that even much more aggressive demand side programs could accomplish this at the economic and population growth rates of the last ten years.

Therefore, although it is likely that federal, state, and local demand side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

RENEWABLE RESOURCES

As noted previously, the Eastshore project was selected by PG&E through its 2004 RFO for new non-renewable generation resources. A separate solicitation process is conducted for PG&E's procurement of renewable resources. PG&E currently obtains approximately 12 percent of its electricity from resources eligible under California's Renewable Portfolio Standard (RPS) Program. In its 2006 RFO for new renewable

generation resources, PG&E sought offers from sellers for energy and capacity to meet PG&E's resource needs and California's RPS program for the years 2007 and beyond. As an example of renewables purchased by PG&E, the company announced in July, 2006 that it had entered into contracts to purchase up to a total of 169 MW of renewable geothermal energy resources.

Staff compared various alternative technologies with the proposed project, scaled to meet the project's objectives. Technologies examined were those principal electricity generation technologies which do not burn fossil fuels such as natural gas: solar, wind, and biomass. Although PG&E plans to acquire geothermal resources, there are no geothermal resources in the project vicinity, making this technology an infeasible alternative to the Eastshore project. Hydroelectric power also does not require burning fossil fuels. However, this power source can cause significant environmental impacts primarily due to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycle. It is unlikely that new hydropower facilities could be developed and permitted in California within the next several years.

Both solar and wind generation can be credited with an absence or reduction in air pollutant emissions and need for related controls, and visible plumes. In the case of biomass, however, emissions can be substantially greater. The California Solar Initiative has set a goal to create 3,000 MW of new solar-produced electricity by 2017. As part of this initiative, the Energy Commission is managing a 10-year, $400 million program to encourage solar in new home construction through its New Solar Homes Partnership. However, such rooftop solar systems would not meet the three basic objectives of the project, and therefore would not constitute a project alternative under CEQA.

Large-scale solar (as opposed to distributed solar generation noted directly above) and wind resources would require large land areas in order to generate 115.5 MW of electricity. Specifically, central receiver solar thermal projects require approximately 5 acres per MW; 115.5 MW would require approximately 575 acres, or 50 to 100 times the amount of land area taken by the proposed Eastshore site and linear facilities. Parabolic trough solar thermal technology requires similar acreage per MW. Photovoltaic (PV) arrays mounted on buildings generally require about 4 acres per MW. To generate 115.5 MW using PV panels, about 460 acres would be needed. Wind-generation "farms" generally require about 4.5 acres per MW; about 520 acres would be needed to generate 115.5 MW. It is unlikely that this amount of acreage would be available in the San Francisco Bay Area. The need for extensive acreage would also add to the complexities of local discretionary actions for land use modifications.

While there would not be visible plumes, other visual impacts of the large solar arrays and windfarm generators must be considered in an area that has many scenic views associated with the Bay. For biomass generation, a fuel source such as wood chips (the preferred source) or agricultural waste is necessary. While these biomass sources would be available in the Central Valley, they are not likely to be available in the project vicinity. In addition, biomass plants are typically sized to generate less than 20 megawatts, which is less than the capacity of the 115.5 MW Eastshore project. In order to generate 115.5 MW, six 20 MW biomass facilities would be required. A biomass

facility would require slightly more land than needed for the Eastshore facility. However, several hundred acres could be required for the feedstock.

Looking outside the San Francisco Bay Area, the development uncertainties and the potential for impacts at remote resource areas are significant constraints.

Furthermore, because alternative generation technologies may not be available on demand, they do not fulfill a basic objective of this plant: to provide quick start capability to respond to unexpected changes in regional demands. Consequently, staff does not believe that geothermal, hydroelectric, solar, wind or biomass technologies present feasible alternatives to the proposed project.

THE “NO PROJECT” ALTERNATIVE

The “no project” alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the “no project” alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that “the purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. §15126.6(i)). Toward that end, the “no project” analysis considers “existing conditions” and “what would be reasonably expected to occur in the foreseeable future if the project were not approved…” (§15126.6(e)(2)). CEQA Guidelines and Energy Commission regulations require consideration of the “no project” alternative. The no-action alternative is compared to the effects of the proposed action. In short, the site-specific and direct impacts associated with the power plant would not occur at this site if the project does not go forward.

If the “no project” alternative were selected, the construction and operational impacts of the Eastshore project would not occur. Demolition of existing buildings, foundations, and paved surface at the site would not occur nor would grading of site and installation of new foundations, piping and utility connections be required. There would be no significant impacts to aviation safety and air traffic and the surrounding airspace. Cumulative impacts of the Eastshore and Russell City projects would be avoided. Community concerns regarding two power plants in Hayward would be addressed.

In the absence of the Eastshore project, however, other power plants could likely be constructed in the project area (e.g., Russell City Energy Center Amendment #1) or in California to serve the demand that could be met with the Eastshore project. These plants could consume more fuel and emit more air pollutants per kilowatt-hour generated than the Eastshore project. In the near term, the more likely result is that existing plants, many of which produce higher level of pollutants, could operate more.

If the project is not built, the region will not benefit from the local, relatively clean and efficient source of 115.5 MW of new generation that this facility would provide. A primary benefit of the Eastshore project is that it would serve load demands of the cities of Hayward, Fremont and San Leandro in the southern East Bay area and also load demands of the city of San Mateo due to its unique location and the existing transmission network. Under certain conditions, Eastshore could be the only major

generator providing generation to the Hayward area. Load demands of Hayward, Fremont and San Leandro are currently met by power from older power plants (Pittsburg, Contra Costa) via the Eastshore substation, as well as imported power via the Newark, Tesla and Vaca Dixon substations (see **Local System Effects**). It is thus difficult to conclude that "no project" would or would not have serious, long-term consequences on the cost or reliability of electricity in the region.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received comments prior to publication of the PSA from the city of Hayward regarding alternatives to the Eastshore Project. The following table provides the City's two concerns relating to Alternatives, as well as the Applicant's response.

ALTERNATIVES Table 3
Response to City of Hayward Comments

City of Hayward Questions regarding Alternatives	Eastshore Explanation
Expand discussion as to why other sites in the East Bay and general vicinity were not considered	Eastshore was selected by PG&E as a result of its 2004 Request for Offers for new generation resources. The Eastshore Project is strategically located within an area that needs 230 kV voltage support and will service local loads which are fed from PG&E's 115 kV distribution system, reducing inefficiencies from importing power on the 230 kV transmission system. Eastshore would tie into the PG&E Eastshore substation, providing much-needed local reliability for the city of Hayward and voltage support to the regional 230 kV transmission system during peak demand hours and when other generation is not available.
More explanation as to why other sites in the area were not considered should be provided, especially in regards to minimum six-acre site size requirements	The Eastshore Project requires 6.22 acre site due to the Wartsila technology that would be used for the project. The fourteen generators would need to be positioned side by side at the site, requiring 6.22 acres.

Sources: EEC 2006a Executive Summary pages 1-1, 1-2, and 1-5; COH 2007a

During the PSA workshop, he city of Hayward and members of the public provided comments on the Alternatives section of this PSA. The city of Hayward (**COH 2007f**) and the applicant (**CH2MHILL 2007g**) filed written comments to the Energy Commission following the PSA workshop. These comments and staff's responses are shown in **Alternatives Table 4**.

ALTERNATIVES Table 4
Response to Comments on the PSA

Comment	Response
City of Hayward (workshop): • Staff Alternative Site D should be identified as the preferred alternative	The Energy Commission's Siting Guidelines do not require the identification of a preferred alternative. The FSA states that Staff Alternative Site D reduces the significant impacts of the Eastshore project and environmental impacts associated with this site appear less than for the other alternatives.
City of Hayward (written response): • Other substations, including the San Mateo substation, should have been evaluated	CEQA requires that a range of reasonable alternatives to the project be evaluated. There appear to be no major environmental impediments to at least two alternative sites that would connect to a different substation. The comment regarding the San Mateo substation is addressed in Alternatives Section: Site Alternatives To The Project.
City of Hayward (written response): • Siting criteria should be broader than not being "adjacent" to residential areas	Comment is addressed in Alternatives Section: Site Alternatives To The Project.
City of Hayward (written response): • Further explanation is needed for elimination of Staff Alt. Site A	Comment is addressed in Alternatives Section: Sites Not Meeting Screening Criteria.
City of Hayward (written response): • Alternative sites need to be further analyzed to reduce impacts.	Comment is addressed in Alternatives Section: Sites Meeting Screening Criteria. Additional research conducted by staff indicated that a land-use variance would not be needed for the two sites in Fremont.
Member of the public: • Rooftop solar should be considered in lieu of project	Rooftop solar is addressed in Alternatives Section: Renewable Resources
Member of the public: • A contract between PG&E and Eastshore does not guarantee the plant being built	Comment noted.
Member of the public: • Health and safety is more important than length and availability of infrastructure	Comment is addressed in Alternatives Section: Site Alternatives To The Project
Member of the public:	Comment is addressed in Alternatives

• Eastshore and Russell City should be combined into one plant	Section: Sites Not Meeting Screening Criteria
Member of the public: • Include Alameda Air Base as an alternative site location	Comment is addressed in Alternatives Section: Sites Not Meeting Screening Criteria
Applicant: • PSA does not recognize that alternative sites constitute the "No Project" alternative.	Comment is addressed in Alternatives Section: Introduction
• Disagrees that project plumes pose safety risk	Comment is addressed in Traffic and Transportation Section
• Disagrees with inclusion of certain alternative sites	Comment is addressed in Alternatives Section: Sites Meeting Screening Criteria

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the PSA, the Eastshore project as proposed would cause potentially significant adverse direct, indirect and cumulative impacts to aviation safety and air traffic patterns and the utility of the Hayward Executive Airport and the surrounding airspace. The Tierra Alt. 2 site would pose similar aviation safety and air traffic impacts. The remaining two Hayward alternative sites (Tierra Alts. 1 and 5) could have similar aviation safety and air traffic concerns. However, the location of these sites is farther removed from airport operations and arrival/departure paths, which could reduce the potential aviation safety and air traffic impacts. As noted previously, PG&E has stated that the Tierra Alt. 1 site would not be available to Eastshore.

The two alternative sites located outside of Hayward (Staff Alt. D and Staff Alt. E) would not pose potential impacts to aviation safety and air traffic. These two sites would connect to the Newark substation, thus not meeting one of the Eastshore project objectives. The two sites would require construction of significantly longer transmission lines. Staff Alt. E could create traffic impacts, although these would likely to be less than what would occur for the Eastshore project and would likely be mitigated.

Staff does not believe that alternative technologies (geothermal, solar, wind, biomass, hydroelectric) present feasible alternatives to the proposed project.

Based on the analysis of alternative sites, Staff Alternative Site D reduces the significant impacts of the Eastshore project and environmental impacts associated with this site appear less than for the other alternatives.

REFERENCES

DBA 2007c – Downey Brand Attorneys/ J. Luckhardt (tn 40274) Eastshore Energy Center's Response to Committee Question in Revised Scheduling Order on Alternatives. 05/04/2007 Rec'd 05/04/2007.

CH2MHill 2007f (tn 40275) Eastshore Supplemental Information. 05/04/2007 Rec'd 05/04/2007.

CH2MHILL 2007g – CH2MHILL/D. Stein (tn 42357) Comments on the PSA in response to CEC Staff's PSA dated 08/17/07. 09/19/2007 Rec'd 09/19/2007.

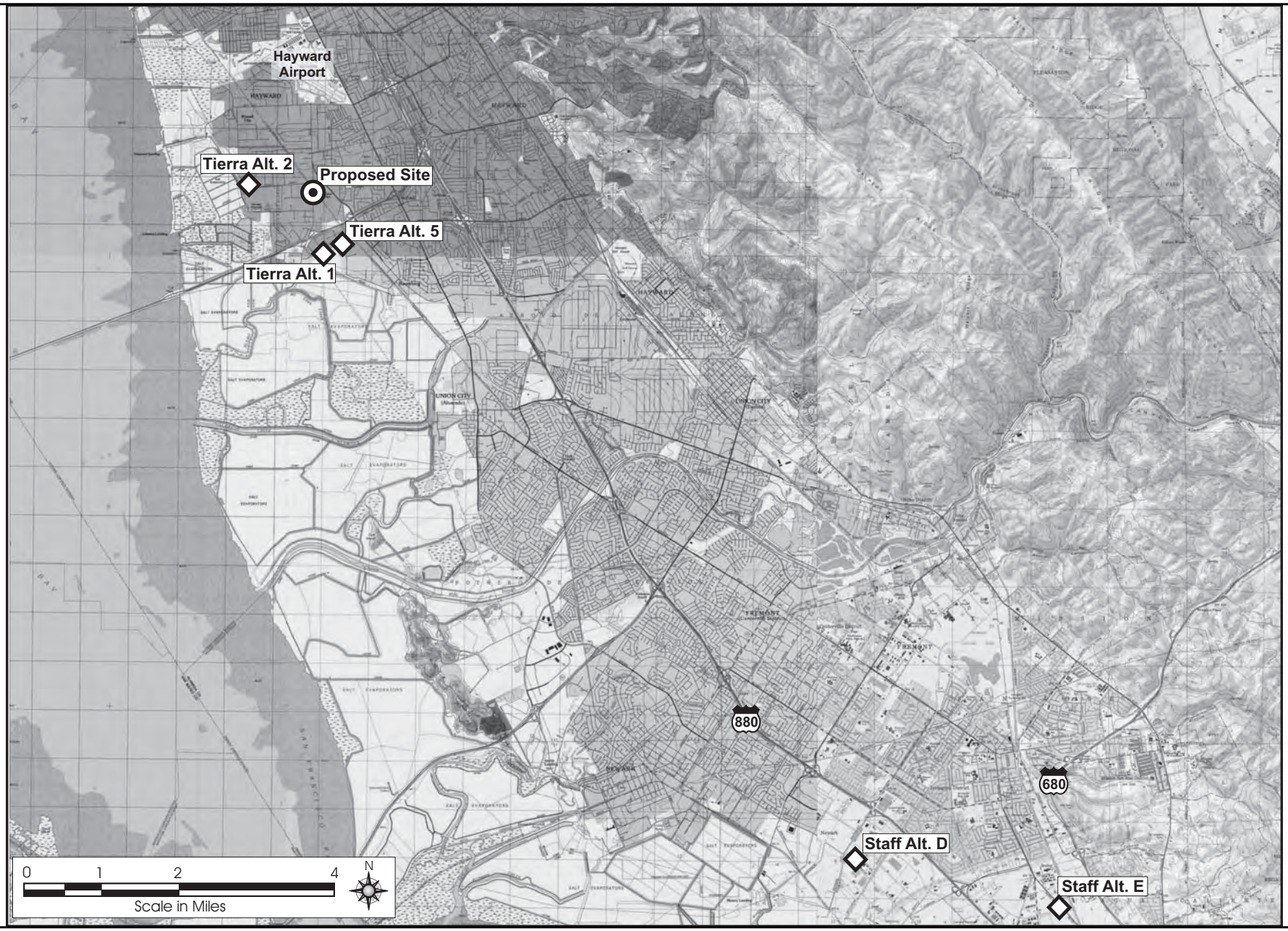
COH 2007a – City of Hayward/ Jesus Armas (tn 38929) Letter from Jesus Armas regarding items for discussion with City of Hayward Staff. 01/12/2007 Rec'd 01/16/2007.

COH 2007f – City of Hayward/D. Risk/G. Jones (tn 42726) Comments of City of Hayward Staff on Eastshore PSA. 10/09/2007 Rec'd 10/10/2007.

EEC 2006a – Eastshore Energy Center, LLC/ G. Trewitt (tn 37923) Application for Certification for the Eastshore Energy Center. 09/15/2006 Rec'd 09/22/2006.

ALTERNATIVES - FIGURE 1

Eastshore Energy Center - Alternative Sites



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: National Geographic Seamless USGS Topographic Maps on CD-Rom (Disc 4), 2004

ENVIRONMENTAL JUSTICE

Testimony of William Pfanner

ENVIRONMENTAL JUSTICE

The following provides a summary of staff's examination of impacts on an identified environmental justice population (greater than 50 percent minority and low-income), per the Energy Commission's environmental justice screening standards.

AIR QUALITY

Staff finds that with the adoption of the **AIR QUALITY** conditions of certification, the proposed Eastshore Energy Center would likely conform with applicable federal, state and Bay Area Air Quality Management District (BAAQMD) air quality LORS, and that the proposed Eastshore project would not result in significant air quality-related impacts. Therefore, there would not be a disproportional impact on an environmental justice population.

HAZARDOUS MATERIALS

Staff's evaluation of the proposed Eastshore project, along with staff's proposed mitigation measures, indicates that hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed **HAZARDOUS MATERIALS** conditions of certification, the proposed project will comply with all applicable LORS. Therefore, there would not be a disproportional impact on an environmental justice population.

LAND USE

Staff has identified significant adverse direct and cumulative impacts to Land Use. However, the issues of sufficient aircraft maneuverability and land use compatibility affect all people in the region, regardless of ethnicity or income level. Therefore, the construction and operation of the Eastshore project, although identified as having a significant environmental impact, is not considered to have a disproportional impact on an environmental justice population. Staff has worked closely with the city of Hayward and the residents of the area to identify local **LAND USE** mitigation measures designed to reduce to the greatest extent possible any impact that will occur in the community surrounding the proposed project. Therefore, there would not be a disproportional impact on an environmental justice population.

NOISE

The Eastshore project, if built and operated in conformance with the proposed **NOISE** conditions of certification, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area including on the area's minority population, either direct or cumulative. The applicant has proposed appropriate mitigation, in the form of good design practice and inclusion of necessary project equipment that would avoid any significant adverse impacts. Therefore, there would not be a disproportional impact on an environmental justice population.

PUBLIC HEALTH

Staff has analyzed potential public health risks associated with construction and operation of the Eastshore project and does not expect there would be any significant adverse cancer, or short - or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed Eastshore project was based on a conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from Eastshore would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. Therefore, there would not be a disproportional impact on an environmental justice population.

SOCIOECONOMICS

Staff concludes that the construction and operation of the Eastshore facility would not cause either a significant direct or cumulative adverse socioeconomic impact on the study area's housing, schools, parks and recreation, law enforcement, emergency services, and hospitals. There are therefore no socioeconomic environmental justice issues related to this project. The facility, as proposed, is consistent with applicable LORS. Therefore, there would not be a disproportional impact on an environmental justice population.

SOILS AND WATER

Staff has not identified any unmitigated significant impacts to soil and water resources associated with the Eastshore, provided that the proposed **SOIL AND WATER** conditions of certification are met. The proposed Eastshore project would comply with all applicable soil and water resource LORS. Potentially significant impacts would be mitigated through both compliance with various city of Hayward (city) municipal codes and the preparation and implementation of construction and operating plans that would detect and correct potential impacts to soil contamination and erosion, surface or groundwater contamination, use of potable water supplies, or non-compliance with stormwater or wastewater treatment and discharge requirements. Therefore, there would not be a disproportional impact on an environmental justice population.

TRAFFIC AND TRANSPORTATION

Staff has identified significant adverse direct and cumulative impacts to Traffic and Transportation. However, the issues of sufficient aircraft maneuverability and land use compatibility affect all people, regardless of ethnicity or income level. Therefore, the construction and operation of the Eastshore project, although identified as having a significant environmental impact, is not considered to have a disproportional impact on an environmental justice population. Staff has worked closely with the city of Hayward and the residents of the area to identify local **TRAFFIC AND TRANSPORTATION** mitigation measures designed to reduce to the greatest extent possible any impact that will occur in the community surrounding the proposed project. Therefore, there would not be a disproportional impact on an environmental justice population.

TRANSMISSION LINE SAFETY/NUISANCE

The project proposes to transmit power from the proposed Eastshore Energy Center to PG&E's electric transmission grid through a new overhead 115 kV transmission line which will connect the project to PG&E's Eastshore Substation, 1.1 miles to the south. The proposed line would traverse an industrial area with no nearby residences, thereby eliminating the potential for residential electric and magnetic field exposure which in recent years has raised human health concerns. PG&E will design, build, operate, and maintain the proposed line according to standard PG&E practices, which would conform to all applicable LORS. With the five proposed **TRANSMISSION LINES SAFETY AND NUISANCE** conditions of certification, any line-related safety and nuisance impacts would be less than significant. Therefore, there would not be a disproportional impact on an environmental justice population.

VISUAL RESOURCES

Staff has analyzed visual resource related information pertaining to the proposed Eastshore project, and found that the project would not introduce an adverse "Aesthetic" impact under CEQA, and would comply with applicable LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources. Staff has determined that all significant direct or cumulative impacts specific to aesthetics, or the preservation and protection of sensitive visual resources resulting from the construction or operation of the project would be mitigated. Therefore, the proposed project would not introduce a visual resources related environmental justice issue. Therefore, there would not be a disproportional impact on an environmental justice population.

WASTE MANAGEMENT

Management of the waste generated during construction and operation of the Eastshore project or the waste associated with remediation of existing on-site contamination would not result in any significant adverse environmental impacts if the measures and remediation proposed in the AFC and staff proposed **WASTE MANAGEMENT** conditions of certification are implemented. Therefore, there would not be a disproportional impact on an environmental justice population.

OUTREACH

Staff's environmental justice outreach has been incorporated into its overall outreach activity facilitated by the Public Advisor's Office. This activity is summarized in the **INTRODUCTION** to the FSA.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Lance Shaw

INTRODUCTION

The project's General Compliance Conditions of Certification, including a Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Fencing for the site is also considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, where the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight, and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2. all monthly and annual compliance reports filed by the project owner;

3. all complaints of noncompliance filed with the Energy Commission; and

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all of the other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegate agencies and consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;

2. providing appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of work or other evidence that the requirements are satisfied.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with

a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, it shall so request in its submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner’s **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates starting project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner’s own risk. Any approval by Energy Commission staff is subject to change based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions

of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and eight copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and submitted as attachments to the Monthly Compliance Report;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. a cumulative listing of any approved changes to conditions of certification;

7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. a listing of the month's additions to the on-site compliance file; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and submitted as attachments to the Annual Compliance Report;

4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a listing of the year's additions to the on-site compliance file;

9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual fee of seventeen thousand six hundred seventy-six dollars ($17,676), which will be adjusted annually on July 1. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all

necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Insignificant Project Changes and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

AMENDMENT

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

CHANGE OF OWNERSHIP

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process takes approximately one month to complete, and requires public notice and approval by the full Commission.

INSIGNIFICANT PROJECT CHANGE

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

VERIFICATION CHANGE

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification. This process usually takes less than five working days to complete.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission

pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and

4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ all pre-construction conditions have been complied with, ▪ the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings: _____
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: _____ Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

EASTSHORE ENERGY CENTER
PREPARATION TEAM

Executive Summary ..... William Pfanner

Introduction ..... William Pfanner

Project Description ..... William Pfanner

Air Quality..... Brewster Birdsall, P.E., QEP

Biological Resources..... Susan Sanders

Cultural Resources..... Beverly Bastian

Hazardous Materials Management..... Alvin J. Greenberg, Ph.D and Rick Tyler

Land Use ..... Shaelyn Stratten and James Adams

Noise and Vibration ..... Shahab Khoshmashrab, P.E.

Public Health ..... Alvin J. Greenberg, Ph.D.

Socioeconomic Resources ..... Joseph Diamond, Ph.D.

Soils and Water Resources..... Richard Latteri

Traffic and Transportation ..... Shaelyn Stratten and James Adams

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Mark Hamblin

Waste Management ..... Suzanne Phinney, D. Env.

Worker Safety and Fire Protection ..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Facility Design..... Steve Baker

Geology and Paleontology ..... Patrick Pilling, Ph.D., P.E., G.E.

Power Plant Efficiency..... Steve Baker

Power Plant Reliability..... Steve Baker

Transmission System Engineering ..... Laiping Ng and Mark Hesters

Local System Effects..... Mark Hesters and Ajoy Guha

Alternatives ..... Suzanne Phinney, D. Env.

General Conditions including Compliance Monitoring & Facility Closure ..... Lance Shaw

Project Secretary..... Dora Gomez

DECLARATION OF
William Pfanner, B.S.

I, **William Pfanner, B.S.** declare as follows:

1. I am presently employed by The California Energy Commission in the **Systems Assessment and Facilities Siting Division** as a **Project Manager**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Introduction, Project Description, Executive Summary, and Environmental Justice** for the Eastshore Energy Center Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/9/07 Signed: William Pfanner

At: Sacramento CA

William Pfanner

HIGHLIGHTS AND QUALIFICATIONS

- Environmental planner with over 25 years of experience
- Skilled in land planning, environmental law and the development process
- Proven history in city, county and state governments
- Knowledge of Federal, State and local agencies and entitlement process
- Successful manager of large staffs and complex projects
- Reputation for leadership, ethics and outstanding communication skills

CURRENT POSITION

California Energy Commission – Project Manager for Systems Assessment and Facility Siting Division. Responsible for siting and permitting power plants in California, requiring interaction with individual citizens as well as city, county, state and federal representatives. This includes: holding public workshops; identifying potential environmental issues and health risks to the public; gathering data; and overseeing the preparation of the project's environmental analysis. (November 2001 to present)

EXPERIENCE IN THE PRIVATE SECTOR

Senior Project Manager - Jones & Stokes. Responsible for managing environmental clearance and regulatory compliance for a 300 mile fiber optic cable installation project in northern California. Facilitated coordination with numerous local, state and federal agencies through final project construction. Also prepared CEQA documents for projects; including the expansion of a wastewater treatment facility and the development of a new recreational marina. (August 1999 to October 2001)

Senior Planner - Quad Knopf. Team leader for siting and permitting Sprint PCS' wireless telecommunication system in the Sacramento region. Also responsible for project management of Environmental Impact Reports, supervision and preparation of technical reports, and the preparation of proposals and firm marketing. (October 1998 to August 1999)

Planning Division Supervisor - Matthews Land Company. Responsible for overseeing planning functions in the Seattle metropolitan area, working to identify viable antenna sites and obtain planning approvals for Nextel's telecommunication system. (July 1997 to October 1998)

Project Manager - Koll Telecommunication Services. Project leader for permitting Sprint PCS' wireless telecommunication system in Sacramento and the Bay Area. Responsible for siting facilities and obtaining planning approvals from city and county jurisdictions, and facilitating the development of collocation sites with other wireless carriers. (January 1996 to June 1997)

Development Consultant - William Pfanner & Associates. Private planning and development consultant. Prepared feasibility studies; assisted in siting design and permitting of a mixed-use residential subdivision, a residential resort facility, and a performing arts and convention center. (January 1987 to December 1995)

Contract Planner - EBA Wastechnologies, Inc. Project Manager. Manager EIR/EIS on a Materials Recovery Facility. Prepared environmental review on Source Reduction/Recycling and Household Hazardous Waste Elements. Prepared Integrated Waste Management Plans. (May 1992 to December 1995)

Environmental Planner - EIP Associates. Project Manager. Prepared EIRs and planning documents on a variety of projects including: a residential/golf course community, the right-of-way preservation/acquisition for light rail, an analysis for a highway corridor redesign, and an analysis for a new university campus. (November 1989 to April 1992)

Project Planner - Michael Clayton & Associates. Assisted in writing EIRs on residential subdivisions and urban in-fill developments and the preparation of the county's Energy. Natural Resources, and Conservation Element and EIR. Also contributed to the preparation of the 120Kv Transmission Line EIS. (January 1987 to October 1989)

EXPERIENCE IN THE PUBLIC SECTOR

City Council, Mayor ProTem and Redevelopment Chairman - Winters, California. (June 1990 to June 1994)

Board of Directors of Woodland Hospital. (June 1992 to December 1994)

Contract Planner - City of Davis. Prepared environmental analysis for a city-operated wastewater treatment/wetlands project proposed in conjunction with the Army Corps of Engineers; completed the city's noise ordinance; wrote CEQA clearance for a new community park; and facilitated the preparation of an opportunity and constraints analysis for the realignment of a major drainage ditch. (January 1993 to October 1993)

Contract Planner - City of Sausalito's Design Review Board. Conducted design reviews and made presentations to Design Review Board. (January 1988 to June 1988)

Senior Planner - Marin County Planning Department. Responsible for the processing of Master Plans, Specific Plans, Subdivisions, Design Reviews, Use Permits and Variances; review of building permits, public information and land divisions; and presentations to Design Review Boards, Planning Commission and Board of Supervisors. Prepared a Community Plan Update involving numerous community workshops and public hearings. (June 1984 to December 1986)

Assistant Planner - City of Clearlake. Responsible for reviewing all building and planning applications to assure conformance with city codes and regulations; assisting the public with planning-related matters including zoning. Use Permits, Variances, Subdivisions, Lot Line Adjustments, reversions to acreage, business licenses, and specific development standards. (August 1981 to June 1984)

TEACHING EXPERIENCE

Instructor - University of California Extension Services. Conducted a one-day course through the University of California Extension Services on small town planning, focusing on how small towns can proactively address economic development, growth pressures, environmental concerns, and maintaining small town character. (1992 and 1994)

EDUCATION

Bachelor of Science - Conservation of Natural Resources, with an emphasis in Environmental Planning, University of California, Berkeley. (1980)

University of California Extension Services - Certificate program courses in Transit Oriented Development, Pedestrian Oriented Development and Traditional Neighborhood Design. (1993-1994)

University of California Extension Services - Certificate program courses in computer graphics, including Photoshop, Pagemaker, Illustrator and Truespace. (1995-1996)

DECLARATION OF
J. Brewster Birdsall

I, J. Brewster Birdsall, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as an Air Quality Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the final staff testimony on Air Quality for the Eastshore Energy Power Plant Licensing Case Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2007 Signed: _____

At: San Francisco, California

Aspen
Environmental Group

BREWSTER BIRDSALL, P.E., QEP
Senior Associate, Air Quality and Engineering

ACADEMIC BACKGROUND
M.S., Civil Engineering, Colorado State University, 1993
B.S., Mechanical Engineering, Lehigh University, 1991

PROFESSIONAL EXPERIENCE

Mr. Birdsall is an environmental scientist who specializes in air quality and noise analyses for land development related projects and air quality risk assessments. He has nine years of consulting experience with expertise in environmental impact assessment under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and the Clean Air Act. His focus is on air permitting, and air quality and noise-impact modeling, which includes field monitoring for traffic and other community noise sources.

Aspen Environmental Group — 2001 to present

Mr. Birdsall's project experience at Aspen includes the following:

Technical Studies for CEC Contract – Review of Power Plant AFCs. Mr. Birdsall assists the California Energy Commission (CEC) as a technical specialist by reviewing and providing testimony on Applications for Certification (AFC) for new power plants throughout California.

- **Tesla Power Plant.** Lead technical staff for air quality assessment and analyst of visible plumes for new 1,120 MW combined cycle power plant and 11-mile recycled water pipeline in rural eastern Alameda County near Tracy.
- **Inland Empire Energy Center.** Lead technical staff for air quality assessment for new 670 MW combined cycle power plant near Romoland in Riverside County.
- **Palomar Energy.** Lead technical staff for air quality assessment and supporting staff for cooling system studies for new 540 MW combined cycle power plant in northern San Diego County.
- **Kings River Conservation District Peaking Power Plant.** Lead technical staff for air quality assessment of new 97 MW simple cycle power plant in Fresno County.
- **Avenal Energy.** Lead technical staff for air quality assessment and analyst of visible plumes for large new combined cycle power plant near Avenal in Kings County.
- **Blythe Energy Project Phase II.** Lead technical staff for air quality assessment for new 520 MW combined cycle power plant and affiliated 118-mile transmission line, in the Mojave Desert and Coachella Valley of Riverside County.
- **Russell City Energy Center.** Lead technical staff for noise assessment of new 600 MW combined cycle power plant adjacent to shoreline recreational areas in Hayward.
- **Los Esteros Critical Energy Facility.** Lead technical staff for noise assessment and analyst of visible plumes for new 180 MW simple cycle power plant adjacent to recreational areas in San Jose.

- **Environmental Performance Report.** Technical review and editorial assistance for environmental portion of the first Integrated Energy Policy Report for the Governor and Legislature.
- **Air Quality Compliance.** Technical staff for analysis of modifications to permit conditions at the Moss Landing Power Plant. Prepared independent analysis of permit requirements and environmental consequences of increasing the capacity of the Midway-Sunset Cogeneration Project.
- **Alternative Cooling Technology Studies.** Supporting staff for analyses of dry cooling and hybrid cooling alternatives for the Cosumnes Power Plant and Palomar Energy Project. Coordinated and edited documentation from design engineers and other specialists.

For the **California Public Utilities Commission**:

- **San Onofre Nuclear Generating Station and Diablo Canyon Power Plant, Steam Generator Replacement Projects.** Currently serving as Deputy Project Manager for Environmental Impact Reports on the proposed improvements to these controversial nuclear power plants. Preparing certain administrative and technical portions of reports and coordinating the environmental documents with team of analysts.
- **Miguel-Mission 230 kV #2 Transmission Line.** Conducted the air quality and noise review for a system that would reduce transmission constraints between San Diego County and generators within the U.S. and Mexico. Provided oversight of the engineers studying impacts to traffic and transportation and the transmission system design.
- **Jefferson-Martin 230 kV Transmission Line.** Prepared air quality and noise studies for construction and operation of a 27-mile transmission line through urban and rural San Mateo County. The project is proposed to meet the projected electric demand in the Cities of Burlingame, Millbrae, San Bruno, South San Francisco, Brisbane, Colma, Daly City, and San Francisco.
- **Viejo System Transmission Project.** Prepared air quality, noise, and traffic analyses for construction of a controversial transmission improvement project in suburban south Orange County.
- **Looking Glass Networks Telecommunications Project.** Prepared the air quality and noise analyses for this Initial Study/Mitigated Negative Declaration (IS/MND) evaluating proposed fiber optic connections throughout the San Francisco Bay and Los Angeles areas, and developed programmatic mitigation measures for implementation of the metropolitan area network.

Presidio Trust, Presidio of San Francisco. Provided impact analysis for demolition, rehabilitation, and infill construction within the Public Health Service Hospital District, within the Golden Gate National Recreation Area and adjacent to sensitive San Francisco residences. Provided technical support and peer review of noise and vibration analyses related to the Doyle Drive Reconstruction through the Presidio of San Francisco. Involved protecting natural sounds consistent with National Park Service policy.

California State Lands Commission, Monterey Accelerated Research System Cabled Observatory. Providing technical analysis of air quality and noise effects of installing new underwater equipment in Monterey Bay. Supporting efforts of marine biologists with analysis of underwater noise.

California State Lands Commission, Concord-Sacramento Pipeline. Provided technical analysis of air quality and noise effects of constructing a new 20-inch, 70-mile petroleum products pipeline, including upgrades to storage tank facilities in Concord and distribution systems in West Sacramento.

California Department of Water Resources, Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project. Provided assessment of air quality and noise impacts for construction of upgrades.

Ventura County Resource Conservation District, Casitas Springs *Arundo Donax* Removal Demonstration Project. Prepared estimates of community noise impacts and air quality assessment for cutting and removing non-native plants for improving flood control along the Ventura River.

Technical Support for U.S. Army Corps of Engineers. Analyzed construction noise and air quality effects and described applicability of general conformity rule for various flood control improvements in Arizona and Southern California.

Technical Support for Los Angeles Unified School District. Provided technical analysis of air quality and noise effects for school expansion, play area expansion, and temporary classroom projects, including reviews of cumulative, regional air quality consequences of temporary projects.

EIP Associates 1998 to 2001

As a Senior Environmental Scientist at **EIP Associates**, Mr. Birdsall performed comprehensive analyses of air quality and noise impacts for Environmental Impact Reports/Statements and independent studies. His projects at EIP included:

- **Bay Area Rapid Transit District, Oakland Airport Connector EIS/EIR.** Prepared noise impact evaluation and mitigation strategies. Conducted community noise monitoring and assessment according to Federal Transit Administration methodology.
- **Presidio Trust Implementation Plan EIS and Letterman Complex Supplemental EIS.** Prepared community noise impact assessment and traffic noise mitigation strategies. Air quality management policy consistency analysis. The plan was awarded the 2003 Outstanding Land Use Plan from the Association of Environmental Professionals.
- **San Francisco International Airport, Offshore Runway Construction Concepts, AGS Design Team.** Conducted preliminary environmental review of design and construction concepts for runway expansion. Prepared emission control strategies for general conformity rule.
- **Sacramento Metropolitan Airport Master Plan EIS/EIR, Sacramento County Department of Environmental Review and Assessment.** Baseline emission inventory and regulatory constraints.
- **Desert Resorts Regional Airport, Thermal, Riverside County.** Emission inventory and general conformity determination for runway extension and taxiway improvements.
- **San Joaquin Area Flood Control Agency, Stockton Areawide Flood Control Projects.** Reviewed emission inventories and retroactive general conformity rule applicability for construction activities.
- **Alameda County Flood Control and Water Conservation District, Zone 7, Altamont Water Treatment Plant EIR.** Analyzed air quality and community noise effects of three potential water plant sites in remote eastern Alameda County.
- **Santa Clara Valley Water District, Coyote Watershed, Lower Silver Creek Project.** Analyzed air quality and community noise effects for Initial Study/Environmental Assessment of constructing flood control improvements and habitat restoration.
- **University of California, Davis.** Prepared campuswide health risk assessment update, which included toxic air contaminant emission inventory and dispersion modeling using ISC.

- **University of California, Berkeley.** Prepared initial air quality and noise technical studies for Long Range Development Plan Update EIR and analyses for Northeast Quadrant Science and Safety Project (Stanley Hall replacement building) EIR.
- **Merced County, Draft University Community Plan.** Prepared air quality and noise background studies and policy discussion papers for the new Merced Campus of the University of California.
- **Allegro Jack London Square Project, SNK Development.** Provided expert testimony on the pile driving noise impacts to residents in a revitalized, high-density City of Oakland neighborhood. Conducted field surveys with City Staff and evaluated compliance with City noise ordinance.
- **Maranatha High School and Playing Fields Project, City of Sierra Madre.** Prepared the community noise technical study for a new private high school with outdoor amphitheater and athletic facilities. Characterized noise from events to determine impact level on sensitive residential community.
- **State Route 275 Modification Project, City of West Sacramento.** Prepared noise technical studies on the realignment of the State Route 275 Modification Project. Required assessment of new traffic noise impacts caused by rerouting traffic to grade level in close proximity of existing sensitive land uses and identification of feasible measures to insulate lodging uses.
- **City of Mountain View, Whisman Road Transit Oriented Development MND.** Deputy Project Manager for Negative Declaration related to high-density office development at the Middlefield-Ellis-Whisman Superfund Site. Prepared various technical sections, managed traffic subconsultant, and coordinated preparing the environmental documents with the city staff.

Trinity Consultants 1994 to 1998

Mr. Birdsall prepared compliance strategies, evaluated modeled impacts, and negotiated air permits while a Project Supervisor at **Trinity Consultants**, an environmental firm specializing in air quality.

- **Browning-Ferris Gas Services.** Coordinated nationwide Title V program implementation, secured numerous new source and operating permits, supported rollout of federal new source performance standards for municipal solid waste landfills and landfill gas to energy facilities.
- **Newmont Mining Joint Venture, Batu Hijau Project.** Environmental impact studies for open-pit metallic mineral mining facility and independent power production facility. Included noise assessment for "greenfield" power plant and air quality impacts evaluation in complex, coastal terrain.
- **Questar Pipeline, TransColorado Pipeline Project.** Secured new source permits for air quality effects related to construction and operation of major natural gas pipeline including compressor stations.
- **Coastal Field Services, Altamont Gas Plant.** Negotiated Title V operating permits for upstream natural gas processing plant and associated field compressor stations.
- **Solvay Soda Ash Joint Venture.** Developed particulate matter modeling protocol with State agency.
- **Potlatch Corporation.** Facilitywide emission inventory and permitting for a wood products plant. Included regionwide analyses of ambient air quality standards and resolving existing modeled violations.

NOISE IMPACT ASSESSMENT MODELS

- Federal Highway Administration Traffic Noise Model
- California Department of Transportation Traffic Noise Model (SOUND32)
- FTA Transit Noise Assessment and Mitigation Methodology

AIR QUALITY MODELING EXPERTISE

MVEI/EMFAC; URBEMIS; CALINE4; SCREEN; ISC; CTDM; TANKS; Landfill Gas Emissions Model.

ADDITIONAL TRAINING AND COURSES

- Fundamentals of Noise and Vibration for the California Energy Commission
- Expert Witness Training, California Energy Commission
- Co-Instructor, Air Permitting Issues for Municipal Solid Waste Landfills, Trinity Consultants
- Fundamentals of New Source Review Workshop, Air and Waste Management Association
- Title V and Compliance Assurance Monitoring Workshops, Air and Waste Management Association
- NATO Advanced Studies Institute, Wind Climates in Cities

PROFESSIONAL AFFILIATIONS AND AWARDS

- Professional Engineer (Mechanical, California #32565)
- Qualified Environmental Professional, Institute of Professional Environmental Practice (#03030005)
- 2001 Outstanding Performance Award presented by the California Energy Commission
- Air and Waste Management Association since 1994

PUBLICATIONS

Smith, P.J., J.B. Birdsall, and P.E. Delamater. "A Discussion of Air Permitting Issues for Landfill Gas-To-Energy Projects." 88th Annual Meeting and Exhibition of the Air and Waste Management Association, San Antonio, Texas, 1995.

Meroney, R.N., D.E. Neff, and J.B. Birdsall. "Wind-Tunnel Simulation of Infiltration Across Permeable Building Envelopes: Energy and Air Pollution Exchange Rates." 7th International Symposium on Measurement and Modeling of Environmental Flows. International Mechanical Engineering Congress and Exposition, San Francisco, California, 1995.

Birdsall, J.B. and R.N. Meroney. "Model Scale and Numerical Evaluation of Tracer Gas Distribution Due to Wind-Forced Natural Ventilation." 9th International Conference on Wind Engineering, New Delhi, India, 1995.

Birdsall, J.B. Physical and Numerical Simulation of Wind-Forced Natural Ventilation, MS Thesis, Colorado State University, Fort Collins, Colorado, 1993.

DECLARATION OF
Susan D. Sanders

I, Susan D. Sanders, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as a Biological Resource Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the final staff testimony on Biological Resources for the Eastshore Energy Power Plant Licensing Case Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 31, 2007 Signed: Susan D Sanders

At: Nevada City, California

Susan D. Sanders

PAR ENVIRONMENTAL SERVICES, INC.
Principal Biologist

EDUCATION

Ph.D Zoology University of California, Davis (1983)

M.A. Zoology University of California, Davis (1979)
B.A. Zoology University of California, Berkeley (1976)

REGULATORY COMPLIANCE EXPERTISE in coordination with state, federal, and local agencies in the environmental review process for projects regulated by the California Environmental Quality Act, National Environmental Policy Act, Federal and State Endangered Species Acts, National Fish & Wildlife Coordination Act, Clean Water Act, and California Coastal Act.

TECHNICAL EXPERTISE in surveys for threatened and endangered wildlife species; biological inventories; habitat management plans; raptor surveys; wildlife habitat assessment; mitigation monitoring; expert testimony, constraints analysis; sensitive species research. Prepared Biological Assessments for endangered, threatened, and candidate species, and conducted field surveys and literature reviews for willow flycatchers, tricolored blackbirds, Swainson's hawks, giant garter snakes, red-legged frogs, burrowing owls, California spotted owls, San Joaquin kit fox, bald eagles, valley elderberry longhorn beetles, vernal pool crustaceans, and many other special-status species.

PROJECT MANAGEMENT EXPERIENCE on large and complex projects, including a two-year survey of 11,000 acres in the Plumas National Forest for a proposed land exchange, involving supervision of eight technical specialists and subconsultants. Responsible for overseeing numerous transportation and revegetation projects and mitigation monitoring programs which involved budget, personnel, and subconsultant management, agency and client coordination, and preparation of technical reports.

CALIFORNIA ENERGY COMMISSION TECHNICAL ASSISTANCE PAR is currently assisting Aspen and the CEC in evaluating the environmental aspects of new power plant applications throughout the state, and also providing technical expertise as an avian specialist. Dr. Sanders is currently involved in the following projects:

- **Pastoria Energy Facility Expansion**. Working with CEC staff, Dr. Sanders met reviewed the Application for Certification and associated reference material, prepared Data Adequacy Form and Data Request and a Preliminary Staff Assessment.
- **San Francisco Energy Reliability Project**: For this project Dr. Sanders reviewed the Application for Certification and related information material, met with CEC staff and United States Fish and Wildlife Service regarding endangered species issues, and prepared a Preliminary Staff Assessment.
- **Black Mountain Wind Energy and 69kV Transmission Line Project**: Acting as CEC's avian specialist, Dr. Sanders reviewed the extensive literature of effects of wind development

on avian populations, met with the Public Interest Energy Research staff, and prepared a comment letter on behalf of CEC for the Notice of Preparation for this project.

CONSULTING EXPERIENCE (1982 - 2005)

Riparian/Wetland Projects. Designed and conducted studies of wildlife use of riparian/wetlands and potential impacts of reduced flows and other proposed stream modifications; provided expert testimony. Representative projects include:

- New York Creek Flat Habitat Assessment, Yuba County, Soper-Wheeler Company (PAR)
- Friends of the American River v. EBMUD, Lower American River, Sacramento County (County of Sacramento);
- Teichert/Granite Aggregate Mining Site, Sacramento County (Holliman, Hackard, & Taylor);
- Lower Laguna Drainage Master Plan, Sacramento County (PAR);
- Natomas Ditch Abandonment and Pipeline Construction Project, Sacramento County (PAR);
- Tuolumne River Wildlife Studies for FERC License, Tuolumne County (Holton & Associates);
- Turner Creek Hydroelectric Project, Plumas County (Jones & Stokes Associates);
- Calabazas Creek Flood Control Project, Santa Clara County (Santa Clara Valley Water District).

Mitigation Monitoring. Supervised the design and ongoing monitoring of wetland and sensitive species mitigation projects, including riparian revegetation, vernal pool creation, and mitigation banking. Some projects involved preparation of a Habitat Mitigation and Monitoring Plan, and long-term monitoring efforts (five years plus), as well as preparation of annual reports, and coordination with US Army Corps of Engineers, US Fish and Wildlife Service, California Department of Fish and Game, California Department of Transportation, and the US Environmental Protection Agency. Projects include:

- Dark Horse Mitigation Monitoring, Nevada County (Nevada City Engineering)
- Northpointe, Burrowing Owl Mitigation Monitoring, Sacramento County (PAR)
- Burrowing Owl Mitigation Monitoring, Meadowview, Sacramento County (PAR)
- Wilbur Avenue Overhead Project, Habitat Restoration for Lange's Metalmark Butterfly, Antioch, Contra Costa County, (PAR)
- Swainson's Hawk Nest Monitoring, Garden Highway, Sacramento, Sacramento County (PAR)
- Sierra College Boulevard Riparian Revegetation Monitoring, Roseville, Placer County (PAR);
- Roseville Sanitary Landfill Riparian Revegetation Project, Roseville, Placer County (PAR);
- State Route 99/Calvine Interchange Vernal Pool Vegetation and Fairy Shrimp Mitigation Monitoring, Sacramento County (PAR);
- Potrero Hills Landfill Bird Deterrence Monitoring, Solano County (Global Environmental);
- B&J Sanitary Landfill Bird Deterrence Monitoring, Solano County (Global Environmental);
- State Route 50/Folsom Boulevard Improvement Project, Beach Lakes Mitigation Bank (PAR);
- Niblick Bridge Riparian Revegetation and Mitigation Monitoring, San Luis Obispo County (PAR).

CEQA/NEPA Documents. Prepared biological resource sections of Environmental Impact Reports/Statements, Initial Studies, and Environmental Assessments for numerous commercial and residential developments, redevelopment projects, transportation projects, dams, and other water projects throughout northern California. Conducted wildlife and plant community surveys, habitat assessments, agency contacts, data analysis and report preparation. Secured 1602 Streambed Alteration Agreements from California Department of Fish and Game, Section 404 Permits from U.S. Army Corps of Engineers, and 401 Permits from Regional Water Quality Control Board. Some representative projects include:

- Folsom Corporation Yard Redevelopment Plan Project, Sacramento County (PAR Environmental Services, Inc. [PAR]);
- Laguna Creek Interceptor and Sewer Alignment Constraints Study, Sacramento County (PAR);
- Marin Public Safety and Emergency Radio System Project, Marin County (Cord Communication)
- Biological Studies for Endangered Species Compliance, Isabella Dam, Kern County (PAR);
- Granite Quarry, Placerville (The Bedrock Group);
- Pacific-Bell Rocklin Central Dialing Station, Rocklin, Placer County (PAR);
- Whitney Oaks Raptor Surveys, Placer County (Live Oak Enterprises/Pulte Homes);
- Croftwood Project Access Roads, Placer County (Planning Center);
- Auburn Ranch Subdivision Project, Placer County (Area West Engineers);
- Equestrian Ridge Estates, Placer County (PAR);
- Willow Creek Assessment District Swainson's Hawk Surveys, Sacramento County (PAR);
- Bucks Lake Spotted Owls Surveys, Menasha Corporation, Plumas County (PAR);
- Roseville Water Facilities Project, City of Roseville, Placer County (Geier & Geier Consulting);
- Hidden Falls Planned Unit Development, Placer County (JJD Properties);
- Sugar Bowl Ski Resort Expansion, Placer County (Omni-Means, Engineers/Planners);
- City of Lincoln Waste Water Treatment Plant Expansion, Placer County (City of Lincoln);
- Lucky/Hatch Annexation, San Joaquin County (Greystone Environmental);
- The Heritage at Bickford Ranch, Placer County (Geobotanical Phenomenology);
- Dixon Garden Apartments, Dixon, Solano County (Planning Concepts);
- South Branch 60 kV Pole Line Project, Roseville, Placer County (PAR);
- Smith-Moulton Pipeline Project, Nevada County (PAR);
- Morada Ranch Annexation, San Joaquin County (Omni-Means);
- Clover Valley Lakes Estates EIR, Placer County (Planning Concepts);
- Turtle Island, Loomis, Placer County (Export International);
- Fort Hunter-Liggett Wildlife Resource Surveys, Monterey County (Jones & Stokes Associates);
- Superconducting Super Collider EIR/EIS, Yolo and Solano Counties (EIP Associates);
- South Lake Tahoe Redevelopment Agency EIR, El Dorado County (Wagstaff & Brady);
- Stanford Ranch EIR, Placer County (Jones & Stokes Associates);
- Northeast Roseville Specific Plan EIR, Placer County, Placer County (Jones & Stokes Associates).

Transportation Projects. Prepared Caltrans Natural Environment Study Reports, Categorical Exemption/Exclusions, Preliminary Environmental Study Forms, and other documentation for bridge replacements, interchange modifications, seismic retrofits, road widenings, emergency storm damage repairs, and other transportation projects in Caltrans Districts 1, 2, 3, 4, 5, and 10. Projects include:

- I-580/Isabel Avenue Interchange Project, Livermore, Alameda County (PAR);
- Gladding Road Bridge Replacement, Coon Creek, Placer County (Planning Concepts);
- Lozanos Road Bridge Replacement, Auburn Ravine, Placer County (PAR);
- Coyote Creek Bridge Replacement Project, Calaveras County (PAR);
- Route 99/Route 120 East Interchange Project, Manteca, San Joaquin County (PAR);
- Route 99/Prado Road Interchange, San Luis Obispo County (PAR);
- Ralston Avenue/Route 101 Interchange, Belmont, San Mateo County (PAR);
- Route 1 Improvement Project, Sand City to Seaside, Monterey County, PEAR (PAR);
- Northeast Area Transportation Plan, Constraints Analysis, Sacramento (PAR);
- Wilbur Avenue Overcrossing Project, Antioch, Contra Costa (PAR);
- Alpine Road Storm Damage Repair, San Mateo County (PAR);
- Pescadero Road Storm Damage Repair, San Mateo County (PAR);
- Route 92 Widening, Half Moon Bay, San Mateo County (PAR);
- Route 99/Hammer Lane Interchange Improvements, Stockton, San Joaquin County (PAR);
- Hammer Lane Widening, Stockton, San Joaquin County (PAR);
- La Gonda Way and Paraiso Drive Bridge Seismic Retrofit, Danville, Contra Costa County (PAR);
- Highway 162 Bridge Storm Damage Repair Project, Sacramento River, Glenn County (PAR);
- Norwood Avenue Reconstruction Project, Sacramento County (Planning Center);
- HOV Lane Construction, US 50, Sunrise to El Dorado Blvd., Sacramento/El Dorado Co. (PAR);
- Dry Creek Bridge Replacement Project, Route 99, Butte County (PAR);
- Ladies Canyon Bridge Storm Damage Repair, Sierra County, (PAR);
- Emergency Storm Damage Repair, Routes 49 and 89, Sierra and Nevada Counties, (PAR);
- Emergency Storm Damage Repair Project for: Route 70/89, Feather River Canyon, Route 20, 147, Plumas, Nevada, and Butte Counties, (PAR);
- Interstate 5 - Benjamin Holt/Hammer Lane Interchange project, San Joaquin County (PAR);
- State Route 113/Interstate 5 Connector Study, City of Woodland, Yolo County, California (PAR);
- Frederickson Road Widening, Antioch, Contra Costa County (May Consulting);
- East Lime Kiln Road Reconstruction Project, Nevada County (PAR);
- Lower Sacramento Road and Bridge Widening, Stockton, San Joaquin County (May Consulting);
- Sierra College Boulevard Widening Project, Roseville, Placer County (PAR);
- State Route 50/Folsom Interchange Improvement Project, Sacramento County (PAR);
- Pico Creek Bridge Replacement Project, Route 1, San Luis Obispo County (PAR)
- Burns Creek Bridge Replacement Project, Route 1, Monterey County (PAR);
- Pajaro River Bridge Replacement Project, Monterey and San Luis Obispo Counties (PAR);

- Route 113 Widening/North 1st Street Improvements, Dixon, Solano County (Planning Concepts);
- Bridgeport School Bridge Replacement Project, El Dorado County (PAR);
- State Route 49 Widening, Auburn, Placer County (PAR);
- Claus Road Bridge Widening, Modesto, Stanislaus County (PAR);
- Interstate 80/Enterprise Boulevard Interchange, City of West Sacramento, Yolo County (PAR).

HEP Analysis. Conducted Habitat Evaluation Procedure (HEP) analyses for Farmington Canal Project, Calaveras County, and Calabazas Creek flood control project, Santa Clara County. Co-author of Habitat Suitability Model for Willow Flycatcher.

Land Exchanges. Prepared Biological Assessments/Evaluations for Forest Service land exchanges in the Plumas National Forest. The largest of these was the 11,000 acre Soper-Wheeler Company land exchange, a two-year project requiring management of eight employees and several subconsultants for surveys of rare plants, California spotted owls, northern goshawks, red-legged frogs, and other sensitive species. Other projects include the Crites Mineral Fraction Land Exchange and the Saunders Land Exchange, Plumas National Forest, (PAR Environmental Services, Inc.).

TEACHING EXPERIENCE

Lecturer. Biology 10, UCD Zoology Department (1985): Instructor - biology for non-majors.
Lab Coordinator. Zoology 2L, UCD Zoology Department (1983-1984): Trained and supervised teaching assistants, managed introductory zoology laboratories.
Teaching Assistant. UCD Zoology Department (1977-1983): General Zoology, Vertebrate Structure, Introductory Biology.
Outstanding UCD Graduate Teaching Assistant (1983).

PUBLICATIONS

Beedy, E. C., S. D. Sanders, and D. A. Bloom. 1991. Breeding status, distribution, and habitat associations of the tricolored blackbird (*Agelaius tricolor*), 1850-1989. June 21, 1991. Jones & Stokes Associates (JSA 88-187.) Sacramento, CA. Prepared for UWFWS, Sacramento, CA.

Sanders, S. D. and M. A. Flett. 1989. The ecology of a Sierra Nevada population of Willow Flycatchers (*Empidonax traillii*), 1986 and 1987. California Management Branch Administrative Report No. 89-3, California Department of Fish and Game.

Harris, J. D., S. D. Sanders, and M. A. Flett. 1987. Willow Flycatcher surveys in the Sierra Nevada. Western Birds. 18:27-36.

Flett, M. A. and S. D. Sanders. 1987. Ecology of a Sierra Nevada population of Willow Flycatchers. Western Birds. 1:37-42.

Sanders, S. D. 1983. Foraging Ecology of a Sierra Nevada population of Douglas Tree Squirrels (*Tamiasciurus douglasii*). Ph.D. Dissertation, University of California, Davis.

DECLARATION OF
Beverly E. Bastian

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Cultural Resources,** for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 1, 2007 Signed: Beverly E. Bastian

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	A.B.D.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	A.B.D.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Facilities Siting Division, Environmental Office, Biological and Cultural Unit,
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; developing mitigation measures to reduce to insignificant any impacts to significant cultural resources; providing expert testimony on my analyses and findings in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants, reviewing the CEQA documents of sister state agencies; consulting and advising cultural resources specialists in sister state agencies; coordinating and reviewing the work of Commission cultural resources consultants; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Conduct major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participate in interdisciplinary teams and project assignments; prepare technical reports and correspondence; carry out inventories and evaluations of historic properties; coordinate the statewide registration of historical properties; assess the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; review environmental documents and provide technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identify resource issues and constraints; establish allowable use and development guidelines; develop approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; propose and develop programs, policies, and budgets to meet Department's historic preservation missions.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of a Phase II archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research

of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority *1979 to 1981, 1983-1984*
Land & Economic Resources, Cultural Resources Program (personal services contract)
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log-cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects
1981-1982 Project Director for the field excavation, historical research, data analysis, and report on Fort Independence, South Carolina (dating to the time of the Revolutionary War) for the U. S. Army Corps of Engineers.
1975-1978 Field Director for the total excavation of French-and-Indian-War-period Fort Loudoun in east Tennessee and laboratory supervisor of artifact conservation and analysis for this project at Vanderbilt University for the Tennessee Division of Archaeology.
1974 Archaeologist and Junior Investigator for intensive historical research and archaeological testing at the defunct 19th-century northeastern Alabama river town of Bellefonte, for the Department of Anthropology and Sociology, University of Alabama, Birmingham.
1973 Teaching Assistant for a summer archaeological Field School at historic Fort Southwest Point, dating to the War of 1812, Department of Anthropology, University of Tennessee.
1967 Crew Foreman for a National Park Service-sponsored salvage excavation project along the Delaware riverfront in Philadelphia, for the Department of American Civilization, University of Pennsylvania.
1966 Excavator and a laboratory technician for two California historic sites, Old Sacramento and Old Columbia, for the Department of Anthropology at the University of California, Davis.

Professional Societies

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
National Council on Public History
Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Public Health, Hazardous Materials Management, and Worker Safety/Fire Protection** sections for the **Eastshore Project** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Nov. 6, 2007 Signed: Alvin Greenberg

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group

January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions

January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee

September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group

January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979
Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a "background" report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. In August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the

Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead oxide contaminated soil at DOD facilities.

Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Ballard Canyon Air Pathway Analysis and Human Health Risk Assessment, Santa Barbara County, Ca. (September 2000)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Infrastructure Security

For the past three years, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has

interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan will be used by all power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He has also led an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Sites with RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on

another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara.

Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca.
(September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms.

Examples

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill,. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),

- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- San Francisco Energy Reliability Project, San Francisco, Ca. 2004-present. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

DECLARATION OF
Rick Tyler

I, **Rick Tyler,** declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I supervised and participated in the preparation of the staff testimony on Hazardous Material Handling and Worker Safety and Hire Protection, for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/8/07 Signed: _____

At: Sacramento Co.

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California
Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

DECLARATION OF
James S. Adams

I, James S. Adams declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Energy Facilities Siting Division as an Environmental Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Traffic and Transportation and Land Use for the Final Staff Assessment for the Eastshore Energy Center, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2007 Signed: _____

At: Sacramento, California

James S. Adams, M.A.
California Energy Commission
1516 9th Street, MS 40
Sacramento, CA 95814
(916) 653-0702
jadams@energy.state.ca.us

5/1999
Present **Environmental Planner II**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics, traffic and transportation, land use and visual resources. Work on special projects as requested.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an intervention by the Surfrider Foundation before the California Public Utilities Commission regarding decommissioning issues concerning Humboldt Bay, Diablo Canyon and San Onofre nuclear reactors.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 I served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic
Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF
SHAHAB KHOSHMASHRAB

I, SHAHAB KHOSHMASHRAB, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **NOISE AND VIBRATION**, for the **Eastshore Energy Center** project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2007 Signed: _____

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento– Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998–Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Joseph Diamond

I, **Joseph Diamond**, declare as follows:

1. I am presently employed by The California Energy Commission.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Socioeconomics for the Starwood Power Project based on my analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/27/2007 Signed: Joseph Diamond

At: Sacramento, CA

Joseph Diamond Ph. D.
Work: (916) 654-3877

Ph.D. with experience in economic policy.

BUSINESS AFFILIATION

California Energy Commission
1516 9th St. MS-40
Sacramento, CA 95814

EDUCATION

Michigan State University	Ph.D.	Resource Development
University of Rhode Island	M.A.	Economics
University of New Hampshire	B.A.	Economics

DECLARATION OF
Richard Latteri

I, **Richard Latteri** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Energy Facilities Siting Division as an Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony for Soil and Water Resources for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 29, 2007 Signed: Richard Latteri

At: Sacramento, California

RESUME

Richard W. Latteri

Energy Facilities Siting Division
California Energy Commission
1516 Ninth Street, MS 40
Sacramento, CA 95814
(916) 651-8859

PROFESSIONAL EXPERIENCE:

2001-Present ***California Energy Commission:*** Technical specialist with the Environmental Siting Office providing analysis of power plant Applications for Certification for potential impacts to soil and water resources. Specific tasks include the identification of impacts to soil and water resources, recommendation of mitigation measures, preparation of testimony, and project monitoring to ensure compliance with applicable requirements.

1993-2001 ***Department of Water Resources – Senior Electric Utilities Engineer:*** Chief, Power Cost Allocation Section with the State Water Project Analysis Office responsible for the supervision of technical staff in the determination and allocation of State Water Project power costs per the provisions of the Water Supply Contract with DWR's twenty-nine long-term State Water Contractors.

1989-1993 ***Department of Water Resources – Senior Electric Utilities Engineer:*** Chief, Electric System Planning Section with both the Energy Division and State Water Project Analysis Office responsible for supervising, planning and directing staff in the analysis of future generation and transmission requirements for the State Water Project.

1981-1989 ***Department of Water Resources – Electric Utilities Engineer /Engineer Water Resources:*** Performed both civil and electric utilities engineering duties in the areas of power plant construction management and as an electricity resource planner conducting supply and demand analyses for the State Water Project.

EDUCATION AND RELEVANT TRAINING

Bachelor of Science, Civil Engineering, California State University, Sacramento
Engineer Officer Course, U. S. Army Engineer School, Fort Belvoir, Virginia

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Staff Toxicologist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Transmission Line Safety and Nuisance** for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 5, 2007 Signed: O Odoemelam

At: _____

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Mark R. Hamblin

I, **Mark R. Hamblin** declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Energy Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I prepared the staff testimony for the Visual Resources section for the proposed Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Nov. 6, 2007 Signed: Mark R. Hamblin

At: Sacramento, California

MARK R. HAMBLIN

Summary

Public administrator/land use planner with 15 years experience addressing land use development matters of concern to citizens and government leaders. Expertise in interpreting public policy pertaining to land use and environmental assessment. Demonstrated ability in working with individuals, and on teams involved in the development permitting process.

Professional Experience

California Energy Commission, Sacramento, CA.
Planner II November 2000 to present.
Prepares an independent technical analysis in the area(s) of land use, traffic & transportation, and visual resources to inform interested persons and to make recommendations to the Energy Commission regarding the consequences of a natural gas fired power generation plant proposal; reviews information provided by the applicant and other sources to assess the environmental effects of a proposal as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations; evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards (LORS); coordinates proposal with federal, state and local agencies; conducts field studies; oversees technical consultant(s); participates in public workshop(s) on proposal; presents sworn testimony during evidentiary hearings; implements compliance monitoring programs for projects approved by the Energy Commission to ensure that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, Woodland, CA.
Associate Planner June 1992 to October 2000.
Advised and assisted individuals in the processing of land use requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed information provided by the applicant and other sources for consistency with the state zoning and planning law, the county General Plan, the county government code, and the requirements of the CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission and/or county board of supervisors; board of supervisors liaison, and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with CEQA and NEPA (National Environmental Protection Act); hired and supervised consultants; executed county zoning administrator duties; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use issues and development proposals in the County.

Yolo County Community Development Agency, Woodland, CA.
Assistant Planner January 1991 to June 1992.
Advised and assisted individuals in the processing of land use requests; reviewed information provided by the applicant and other sources for consistency with the county

General Plan, the state and county government code, and the requirements of CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission; drafted zoning ordinances; prepared environmental assessment documents in accordance to the CEQA; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Tulare County Planning and Development Department, Visalia, CA.
Planning Technician II March 1988 to January 1990.
Advised and assisted individuals in the processing of land use requests, specifically special-use permits, variances, parcel and subdivision maps; reviewed information provided by the applicant and other sources for consistency with the county General Plan, the state and county government code, and the requirements of CEQA; collected and evaluated information for presentation in a staff report on the proposed land use request for consideration by the county zoning administrator, site plan review committee, or planning commission; prepared environmental assessment documents in accordance with CEQA; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Education

University of California, Davis Extension. Coursework in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.
Cosumnes River College. Coursework in Television and Radio Broadcasting1990 to 1991.
California State University, Bakersfield. Master of Public Administration; August 1988. Concentration in Public Policy. Coursework in Business Administration and Political Science.
California State University, Sacramento. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.
Porterville College. Associate in Arts Social Science; May 1982. Coursework in Administration of Justice.

Awards

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "21 Day, 4, 6, and 12 Month Processes Team." California Energy Commission.

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "Expedited 4 Month AFC/SPPE Team," California Energy Commission.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Alternatives for the Eastshore Energy Power Plant Licensing Case Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2007 Signed: Suzanne L Phinney

At: Sacramento, California

SUZANNE L. PHINNEY, D. ENV.
Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission

- **California Energy Commission.** Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.
  - Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 **Environmental Performance Report** (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
  - Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on **liquefied natural gas (LNG).** She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach; these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 20045 federal Energy Bill. She has provided technical support to the LNG Interagency Working Group since 2002.
  - Dr. Phinney contributed to **natural gas** supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007

Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*

- Dr. Phinney served as Project Manager for the 2005 IEPR document ***Petroleum Infrastructure*** *Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- Dr. Phinney coauthored the document *Potential Changes in* ***Hydropower Production*** *from* ***Global Climate Change*** *in California and the Western United States.* This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- Dr. Phinney is currently the Project Manager for 3-year study evaluating the effects of **advanced transportation technologies and fuels** (out to 2050) on California's natural gas and electricity systems. This report involves the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- Dr. Phinney recently authored a CEC report on the linkages between **land use and energy**. This report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. She participated in a follow-up report on further defining the role of land use in meeting California's energy and climate change goals.
- Dr. Phinney prepared a review and update of **alternative electric generation technologies**. This report provided in-depth analysis of how solar thermal, solar PV, geothermal, hydropower, and wind technologies could be used as alternatives to central power stations.
- Dr. Phinney has prepared staff assessment **Alternatives Analyses** for several power plants and reports on use of **alternative cooling approaches**.

- **California Public Utilities Commission.** Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.
  - Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations for two telecommunications projects. The **Looking Glass Networks** project involved construction in the San Franciso Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations. The **Williams Communications Sentry Marysville Project** provided fiber optic connection to an air force base in Yuba County.
  - Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, for the Miguel Mission Transmission Line EIR and the Sunrise Powerlink EIR.
  - Dr. Phinney is managing an Initial Study/Mitigated Negative Declaration for expansions at a natural gas storage facility in Solano County.

- **CalTech/University of California.** Dr. Phinney managed the **Combined Array for Research in Millimeter-wave Astronomy** joint EIS/EIR for the US Forest Service and the University of California for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites. The project was built and is currently operational.

GenCorp 1999 to 2000

As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern

Aerojet General Corporation 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

Previous Experience 1976 to 1984

As a Senior Environmental Scientist for **Jacobs Engineering Group,** conducted toxicological, ecological, and air and water quality assessments.

As Research Associate for the **Department of Environmental Science and Engineering at the University of California**, Los Angeles, analyzed legal, economic, public health, and administrative barriers to waste water reuse. Also conducted analysis of ecological and institutional factors in coastal siting of power plants.

As Instructor at **Southwest Los Angeles Junior College** taught lecture and laboratory course in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998

- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L. and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren., "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AIChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF
Steve Baker

I, **Steve Baker,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Facilities Siting Division as a **Senior Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency, Power Plant Reliability** and **Facility Design**, and supervised preparation of the staff testimony on **Noise and Vibration** and **Geology and Paleontology**, for the **Eastshore Energy Center Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2007 Signed: _____

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-three years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California — No. M27737 expires 6/30/08

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

DECLARATION OF
PATRICK A. PILLING, Ph.D., P.E., G.E.

I, Patrick A. Pilling, declare as follows:

1. I am presently employed by Black Eagle Consulting, Inc. under contract with the California Energy Commission Facilities Siting and Environmental Protection Division as a Geotechnical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **GEOLOGY AND PALEONTOLOGY**, for the **Eastshore Energy Center Project** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 8, 2007 Signed: _____

At: Reno, Nevada

PATRICK A. PILLING, Ph.D., P.E., G.E.

Executive Vice President
Principal Geotechnical Engineer

Education

- $ B.S. B Civil Engineering B1986 B Santa Clara University
- $ M.S. B Civil Engineering B 1991 B San Jose State University
- $ Ph.D. B Civil Engineering B 1997 B University of Nevada, Reno

Registrations

- P.E. - Civil - Nevada – No. 9153
- P.E. - Civil – California – No. C 49578
- P.E. - Geotechnical – California – No. GE 2292
- P.E. - Civil - Oregon – No. 19675PE
- P.E. – Geotechnical – Oregon – No. 19675PE
- P.E. - Civil – Arizona – No. 35310
- P.E. - Civil – Utah – No. 971338-2202

Associated Experience

- University of Nevada, Reno - Course Instructor - CE 771 - Mining Waste Containment Design
- University of Nevada, Reno - Course Instructor - CE 771 - Practical Foundation Engineering

Experience

1997 to Present: Black Eagle Consulting, Inc.; Executive Vice President. Dr. Pilling maintains over 18 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. As Executive Vice President, Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinates company marketing efforts, and performs project management, engineering and laboratory analyses, and report preparation on most projects. Dr. Pilling presently serves as our project manager of the Reno Retrack construction management team reviewing geotechnical design submittals for this rail project.

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects. Responsibilities included design and construction of drilled shafts, earth retention, and underpinning systems, in addition to construction scheduling and cost control.

Affiliations

- American Public Works Association
- American Concrete Institute: Concrete Field Testing Technician Grade I
- National Society of Professional Engineers
- Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- American Society of Civil Engineers
- International Association of Foundation Drilling
- National Council of Examiners for Engineering and Surveying
- American Society of Engineering Education
- Deep Foundations Institute

Publications

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, June 1996, ADevelopment of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects,@ Report No. CCEER-94-4, University of Nevada, Reno; Federal Study No. F94TL16C, Submitted to State of California Department of Transportation (CalTrans).

Ashour, M., P. A. Pilling, and G. M. Norris, March 1997, ADocumentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups,@ Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, pp. 344-359.

Ashour, M., P. Pilling, and G. Norris, 1998, "Updated Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Piles and Pile Groups," Proceedings, 33rd Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Reno, pp. 177-178.

Ashour, M., G. Norris, and P. Pilling, April 1998, ALateral Loading of a Pile in Layered Soil Using the Strain Wedge Model,@ Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, pp. 303-315.

Ashour, M., G. M. Norris, S. Bowman, H. Beeston, P. Pilling, and A. Shamsabadi, March 2001, "Modeling Pile Lateral Response in Weathered Rock," Proceeding 36th Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Las Vegas, 2001.

Ashour, M., G. Norris, and P. Pilling, July/August 2002, "Strain Wedge Model Capability of Analyzing the Behavior of Laterally Loaded Isolated Piles, Drilled Shafts, and Pile Groups," Journal of Bridge Engineering, ASCE, Vol. 7, No 4, pp. 245-354.

Ashour, M., P. Pilling, and G. M. Norris, March 26 – 31, 2001, "Assessment of Pile Group Response Under Lateral Load," Proceedings, 4th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, University of Missouri – Rolla, MO, Paper 6.11.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, March 1995, AThe Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis,@ Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, pp. 40-53.

Norris, G. M., P. K. Gowda, and P. A. Pilling, February 1993, AStrain Wedge Model Formulation for Piles,@ Report No. CIS 91-11, University of Nevada, Reno.

Pilling, P. A., 1997, AThe Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model,@ Doctoral Dissertation, University of Nevada, Reno.

Pilling, P. A. and P. V. Woodward, March 1995, ADependent Facility Closure in California,@ Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, pp. 315-326.

Pilling, P.A. and H. E. Beeston, March 1998, AExpansion Testing of Clay Soils in Forensic Investigations,@ Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, 2001, "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, Paper No. 01-0174, pp. 115-121.

Pilling, P.A., July 2002, "Assessing the Liquefaction Potential of Sand Deposits Containing an Appreciable Amount of Gravel," Program with Abstracts 2002 Annual Meeting Association of Engineering Geologists and American Institute of Professional Geologists, Reno, Nevada, p35.

Awards

- Hugh B. Williams Industry Advancement Scholarship, International Association of Foundation Drilling (ADSC), 1993-94.
- National Society of Professional Engineers, Northern Nevada Chapter, Young Engineer of the Year, 1996.

DECLARATION OF
LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Transmission System Engineering, for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Laiping Ng Signed: 10/12/2007

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).

- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.

- Perform load flow studies and fault analysis.

- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.

- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.

- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.

- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Local System Effects,** for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/8/07 Signed: _____

At: SACRAMENTO

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Transmission System Engineering,** for the Eastshore Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/8/07 Signed: _____

At: Sacramento

Mark Hesters
Associate Electrical Engineer

Mark Hesters has fourteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION OF
AJOY GUHA

I, **Ajoy Guha,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Energy Facilities Siting Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Local System Effects**, for the **Eastshore Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11-6-07 Signed: Ajoy Guha

At: Sacramento, California

RESUME

AJOY GUHA

Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:
MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:
REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLIINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.
Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

DECLARATION OF
Lance Shaw

I, **Lance Shaw** declare as follows:

1. I am presently employed by the California Energy Commission in the **Siting OFFICE** of the Systems Assessments and Facilities Siting Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Compliance General Conditions**, for the Eastshore Energy Center Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 4 Oct. 07 Signed: Lance Shaw

At: Sacramento, California

Lance Shaw
Compliance Project Manager (Planner II)

Education: Bachelor of Science, Electrical Engineering – New Mexico State Univ. 1/68.
Master of Arts, Business Administration – Arizona State Univ. 8/69

Experience Summary: **California Energy Commission** Systems Assessment & Facilities Siting Division: – Oct '02 to Present, Compliance Project Manager. Duties include providing oversight of energy facility construction, operation activities to ensure compliance with conditions of certification, processing of post-certification amendments, complaints, and facility closures.

Aug. '99 to Oct '02, Siting Project Manger. Duties included managing the work of multidisciplinary teams analyzing environmental, and engineering impacts of proposed power plants. Managed several projects including Blythe 1 to certification; San Mateo Substation, Scott Substation both withdrawn; Rio Linda, and Roseville, both were suspended and withdrawn; and Avenal suspended.

Telecommunications Division of General Services – July '94 to July '99, Associate Telecommunications Engineer, Project Manager. Duties included managing the work of teams designing and installing public service safety telecomm systems for several state agencies, including Dept. of Water Resources, Dept. of Corrections, Highway Patrol, and Dept. of Parks and Recreation. Before promoting to the Associate level, I worked as an electrical engineer.

U.S. Small Business Administration, Disaster Relief Div. – July '92- July '94, Construction Analyst (Team Lead). Duties included training, managing, and reviewing the work of as many as 30 engineers, architects, contractors and others working in "declared disaster" areas. Assessed disaster-related damage losses to business and homeowners, and recommending approvals for low interest loans, to restore the economy rapidly. I worked on disasters in Big Bear, CA; Kauai, HI; Sioux Falls, SD; Laguna Beach, CA; and Hollywood, CA.

Prior to '92, I managed inter-disciplinary teams as a project manager in several industries. I have managed a mechanical engineering department, a marketing department, and a sale and service department, purchasing departments. I have successfully managed and performed in 5 Fortune 500 companies (Including GE's Nuclear Energy Div.) and start-ups. I managed two crews of Operating Engineers union workers for A.Teichert & Son Inc. Worked 15 years in "Silicon Valley" managing high-technology project teams in the semiconductor wafer processing equipment industry, computer manufacturing, and semiconductor marketing engineering. As an adjunct (graduate and undergraduate) professor for the University of Phoenix's 6-campus Sacramento Valley Region, I earned the distinction as the most outstanding business professor in 1998, and same distinction in undergrad business in 1999. I was one of the editors on two best-selling business/creative books by Roger von Oech, Ph.D. "A Whack on the Side of the Head", and "A Kick in the Seat of the Pants". I wrote and got published two articles on creative parenting as a single joint-custody dad of two pre-schoolers.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE EASTSHORE ENERGY CENTER IN CITY OF HAYWARD BY TIERRA ENERGY	**Docket No. 06-AFC-6** **PROOF OF SERVICE** **(Revised 10/12/2007)**

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-6
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Greg Trewitt, Vice President
Tierra Energy
710 S. Pearl Street, Suite A
Denver, CO 80209
greg.trewitt@tierraenergy.com

Harry Rubin, Executive Vice President
RAMCO Generating Two
1769 Orvietto Drive
Roseville, CA 95661
hmrenergy@msn.com

APPLICANT'S CONSULTANTS

David A. Stein, PE
Vice President
CH2M HILL
155 Grand Avenue, Suite 1000
Oakland, CA 94612
dstein@ch2m.com

Jennifer Scholl
Senior Program Manager
CH2M HILL
610 Anacapa Street, Suite B5
Santa Barbara, CA 93101
jscholl@ch2m.com

COUNSEL FOR APPLICANT

Jane Luckhardt, Esq.
Downey Brand Law Firm
555 Capitol Mall, 10th Floor
Sacramento, CA 95814
jluckhardt@downeybrand.com

INTERESTED AGENCIES

Larry Tobias
CA Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630
ltobias@caiso.com

Electricity Oversight Board
770 L Street, Suite 1250
Sacramento, CA 95814
esaltmarsh@eob.ca.gov

James Sorensen, Director
Alameda County Development Agency
224 West Winton Ave., Rm 110
Hayward CA 94544
james.sorensen@acgov.org
chris.bazar@acgov.org
eileen.dalton@acgov.org

Richard Winnie, Esq.
Alameda County Counsel
1221 Oak Street, Rm 463
Oakland, CA 94612
richard.winnie@acgov.org
susan.muranishi@acgov.org

Greg Jones, City Manager
City of Hayward
777 B Street
Hayward, California 94541
greg.jones@hayward-ca.gov
michael.sweeney@hayward-ca.gov
maureen.conneely@hayward-ca.gov

INTERVENORS

Paul N. Haavik
25087 Eden Avenue
Hayward, CA 94545
lindampaulh@msn.com

ENERGY COMMISSION

Jeffrey D. Byron, Presiding Member
jbyron@energy.state.ca.us

John L. Geesman, Associate Member
jgeesman@energy.state.ca.us

Susan Gefter, Hearing Officer
sgefter@energy.state.ca.us

Bill Pfanner, Project Manager
bpfanner@energy.state.ca.us

Caryn Holmes, Staff Counsel
cholmes@energy.state.ca.us

Public Adviser
pao@energy.state.ca.us

DECLARATION OF SERVICE

I, Dora Gomez declare that on November 9, 2007, I deposited copies of the attached Final Staff Assessment for the Eastshore Energy Center Project (06-AFC-6), in the United States mail at Sacramento, CA, with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of the California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original Signature in Dockets
Dora Gomez