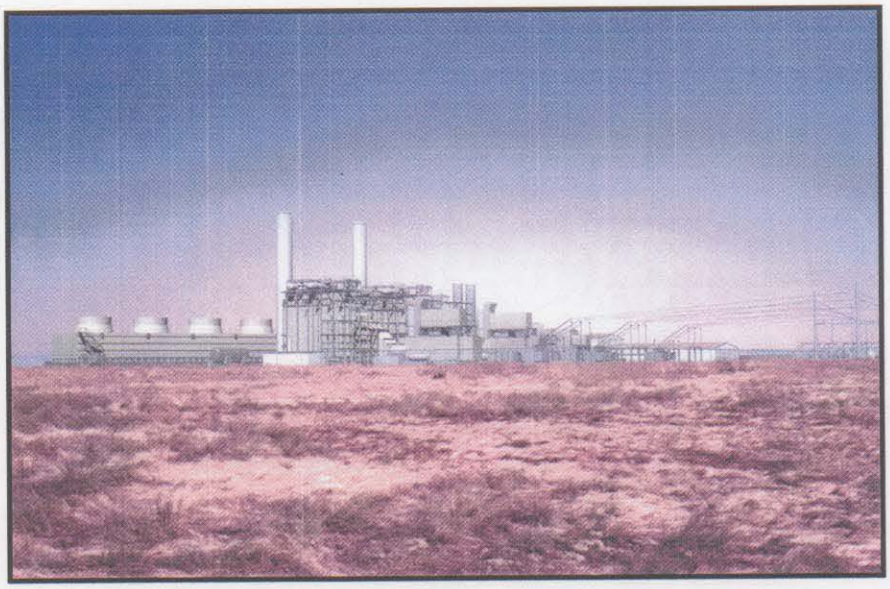
Final Staff Assessment

ROSEVILLE ENERGY PARK

Application For Certification (03-AFC-1)
Placer County

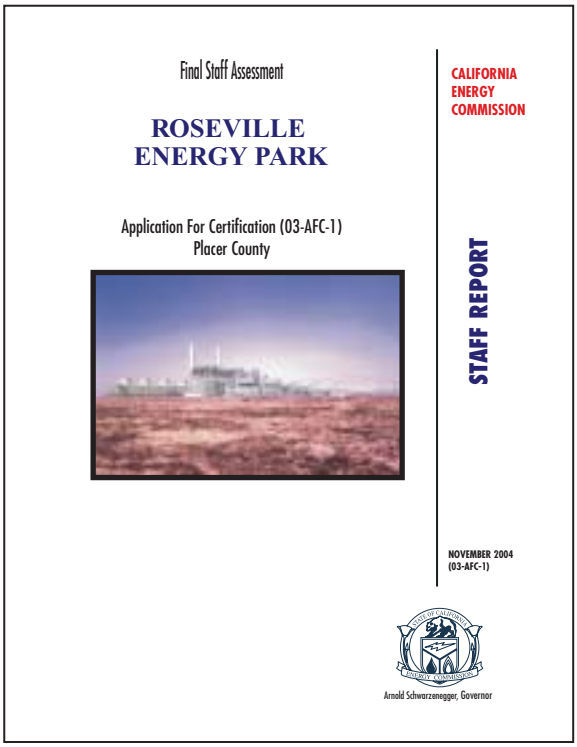


CALIFORNIA ENERGY COMMISSION

STAFF REPORT

NOVEMBER 2004
(03-AFC-1)

Arnold Schwarzenegger, Governor



CALIFORNIA ENERGY COMMISSION

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EXECUTIVE SUMMARY

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission (Energy Commission) staff's independent analysis and recommendation on the Roseville Energy Park (REP or project). The REP and related facilities, such as the natural gas line, reclaimed and potable water supply lines are under the Energy Commission's jurisdiction. When issuing a license, the Energy Commission acts as lead state agency under the California Environmental Quality Act, and its process is functionally equivalent to the preparation of an environmental impact report.

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

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. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

PROJECT LOCATION AND DESCRIPTION

On October 30, 2003, The City of Roseville's electric department, doing business as Roseville Electric (RE) filed an Application for Certification (AFC), for its proposed Roseville Energy Park (REP) with the California Energy Commission seeking approval to construct and operate a 120 to 125 megawatt (MW) natural gas-fired, combined-cycle electric generating facility. As proposed, the REP will have the ability to peak-fire to 160 MW.

The proposed project would be located on an 8.9-acre site within a 40-acre City of Roseville parcel. The project site is within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The project site is owned by the City of Roseville and is zoned Public/Quasi-Public. Surrounding land uses currently include ranching (agricultural grazing) and rural residential. The project area to the south, east, and west, however, is proposed for residential, industrial, and commercial development under the West Roseville Specific Plan (WRSP). The WRSP is a plan for development of 3,162 acres and was approved by the City of Roseville in February of 2004. Build-out of the WRSP would take place

over approximately 10 years. The first 12 subdivision maps have been submitted to the City for approximately 2100 homes in the first phase of development.

Natural gas for the project would be delivered by the Pacific Gas and Electric Company (PG&E) gas system via one of two alternate new pipelines (Alternative A or Alternative D). A 60-kilovolt (kV) on-site switchyard would deliver the plant's power directly to the grid through a double-circuit 60 kV transmission line that would be located adjacent to the project site. This new line would be constructed along the current alignment of Phillip Road as part of the West Roseville development and would be looped directly through the project switchyard. A 50-foot-long pipeline would supply tertiary treated recycled waste water from the City of Roseville's adjacent PGWWTP for use as cooling tower makeup water, firewater, service water, and process makeup water.

The project is proposed to be operational in the summer of 2006.

A more complete description of the project is contained in the **PROJECT DESCRIPTION** section of this PSA.

PUBLIC AND AGENCY COORDINATION

The Energy Commission's REP Committee conducted an Informational Hearing and Site Visit on January 28, 2004. This hearing provided a forum for the public to learn about the project, the Energy Commission's process, ask questions, and voice their opinions regarding the proposed power plant.

When the AFC was filed, staff mailed a notice to all property owners adjacent to the proposed project informing them of the proposal, and the Energy Commission's review process. Staff's notice also informed the property owners of the methods available for participating in the Commission's review of the proposal.

Staff also coordinated their review of the REP with relevant local, state and federal agencies, such as the City of Roseville, Placer County, the California Independent System Operator, the Placer County Air Pollution Control District, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the California Department of Fish and Game. This FSA provides agencies and the public the opportunity to review the Energy Commission staff's final analysis of the proposed project.

Written comments on the PSA from the public and agencies were taken into consideration in preparing this Final Staff Assessment (FSA).

ENVIRONMENTAL JUSTICE

EPA guidelines on environmental justice state that if 50 percent of the population affected by a project has minority or low-income status, it must be determined if these populations are exposed to disproportionately high and adverse human health or environmental impacts.

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed REP power plant (please refer to **Socioeconomics Figure 1**). However, as indicated in **Socioeconomics Figure 1**, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius. Staff also reviewed Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Because staff has determined there to be pockets or clusters of minority population within the six-mile radius, staff has incorporated environmental justice concerns in its analysis.

When a minority or low-income population is identified, staff in the technical areas of air quality, public health, hazardous materials, noise, water, waste, traffic and transportation, visual resources, land use, socioeconomics, and transmission line safety and nuisance must consider possible impacts on the minority/low-income population as part of their analysis. This environmental justice analysis consists of identification of significant impacts (if any), identification of mitigation, and determination of whether there is a disproportionate impact if an unmitigated significant impact has been identified.

Staff has concluded that the project does not result in any significant unmitigated impacts to an environmental justice population. A complete analysis of the potential environmental justice impacts of the proposed project is presented in this Final Staff Assessment.

STAFF'S ASSESSMENT

Each technical area section of the FSA contains a discussion of impacts, staff's preliminary conclusions and recommendations, and, where appropriate, mitigation measures and conditions of certification. The FSA includes staff's assessments 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; and
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation.

Staff's final analysis indicates that the project's environmental impacts can be mitigated to levels of less than significant, and that the project can be made to conform with all applicable LORS. The following table summarizes the potential environmental impacts and LORS compliance for each technical area.

Technical Discipline	Environmental / System Impact	LORS Conformance
Air Quality	Impacts Mitigated	Yes
Biological Resources	Impacts Mitigated	Yes
Cultural Resources	Impacts Mitigated	Yes
Power Plant Efficiency	No Impact	N/A
Power Plant Reliability	No Impact	N/A
Facility Design	Impacts Mitigated	Yes
Geology	Impacts Mitigated	Yes
Hazardous Materials	Impacts Mitigated	Yes
Land Use	Impacts Mitigated	Yes
Noise	Impacts Mitigated	Yes
Public Health	Impacts Mitigated	Yes
Socioeconomics	No Impact	Yes
Traffic and Transportation	Impacts Mitigated	Yes
Transmission Line Safety	Impacts Mitigated	Yes
Transmission System Engineering	Impacts Mitigated	Yes
Visual Resources	Impacts Mitigated	Yes
Waste Management	Impacts Mitigated	Yes
Water and Soils	Impacts Mitigated	Yes
Worker Safety	Impacts Mitigated	Yes

Air Quality

With the recommended conditions of certification, staff has determined:

a. the REP operational emissions of SOx would be fully mitigated to a level of insignificance and would not cause or contribute to a violation of any of the SO_2 state or federal ambient air quality standards or to act as a precursor to the downwind formation of secondary PM10/PM2.5 with the limitations provided herein.

b. the REP operational emissions of VOC would be fully mitigated to a level of insignificance and would not contribute to the downwind formation of ozone with the limitations provided herein.

c. the REP operational PM10 emissions would be fully mitigated to a level of insignificance and would not contribute to existing PM10 violations of the state PM10 ambient air quality standards with the limitations provided herein.

d. the REP operational emissions of CO would not cause or contribute to a violation of the state or federal CO ambient air quality standards and thus does not represent a significance impact on the ambient air quality.

The Placer County Air Pollution District has submitted an Final Determination of Compliance that concludes that the REP would comply with all applicable District rules

and regulations and has proposed a set of conditions presented here as Conditions of Certification **AQ-1** through **AQ-122**.

Staff has determined that the REP operational emissions of NOx would be fully mitigated to a level of insignificance and would not have the potential to cause a direct impact on the state or federal NO_2 ambient air quality standards or to contribute to the downwind formation of ozone or secondary PM10/PM2.5 with the limitations provided herein. Because the applicant has yet to secure adequate ERCs to offset the NOx impacts, staff has recommended that REP be restricted to operate only at levels currently offset, (see **AQ-SC8**).

To minimize the formation of secondary PM2.5 from excessive ammonia slip, staff recommends that the REP ammonia slip be limited to no more than 5 ppm @ 15 percent O_2 averaged over 3 hours. RE is proposing an ammonia slip limit of 10 ppm @ 15 percent O_2, although staff concludes that 5 ppm @ 15 percent O_2 would pose no significant financial or technical burden.

Commission staff recommends the inclusion of additional Conditions of Certification **AQ-SC1** through **AQ-SC9** that address construction impacts, emissions offsets, and ensures that RE complies with the assumptions made in this assessment. Staff further recommends the inclusion of Conditions of Certification **AQ-SC10** through **AQ-SC12** as requested by the District.

Biological Resources

RE has submitted a revised wetland delineation that has not yet been accepted by the U.S. Army Corps of Engineers (USACE). Until the USACE verifies the complete wetland delineation, RE cannot submit a 404 permit application, the USACE cannot begin consultation with the USFWS, and the timeline for the USFWS issuing a Biological Opinion (135 days from request for consultation) could affect the schedule for project construction. In addition, staff has determined that the amount of mitigation needed to address potential project impacts is greater than the amount proposed by the applicant and has proposed mitigation that meets minimum USFWS compensation requirements.

Traffic and Transportation

Staff identified a potential traffic hazard posed by cooling tower plumes that could form ground fog and significantly reduce visibility for motorists using Phillip Road and other planned roadways (see **Traffic and Transportation Figure 3**). After conducting a cooling tower plume ground fogging analysis, staff determined that there is a potential for ground fogging to occur approximately 10 to 15 hours per year during winter. The fog would be opaque, observable, and could occur anywhere within 4,000 feet of the cooling towers. This could significantly reduce visibility and increase the chance of a traffic accident. Staff contacted the Chief of Engineering with Caltrans District 3, and another engineer with Fehr & Peers, a local traffic and transportation consulting firm, about the potential adverse traffic impact from the ground fogging plumes. Both traffic engineers said there would be potential adverse traffic safety impacts on local roads near the REP.

Commission staff is proposing Condition of Certification **TRANS-7** that requires the cooling towers be built with plume abatement technology. The purpose of the plume abatement technology would be to significantly reduce, if not eliminate, the potential for any ground fogging traffic safety impacts from the REP cooling towers.

CONCLUSION AND RECOMMENDATIONS

Staff has determined the project would comply with LORS and not cause any unmitigated adverse significant impacts to the environment, public health and safety, or the transmission system, provided the recommended conditions of certification are implemented.

ROSEVILLE ENERGY PARK
FINAL STAFF ASSESSMENT

INTRODUCTION

Testimony of James W. Reede, Jr., Ed.D

PURPOSE OF THIS REPORT

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

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

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

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

ORGANIZATION OF THE STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

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

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

ENERGY COMMISSION SITING PROCESS

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

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

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, §

1743(b)). Staff is required to coordinate with other agencies to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

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

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

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

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding 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. A revised PMPD will be circulated for a comment period to be determined by the Committee. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any intervenor may request that the Energy Commission reconsider its decision.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the FSA and other evidence presented at the hearings. The

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

Agency Coordination

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

PROJECT DESCRIPTION

Testimony of James W. Reede, Jr., Ed.D

INTRODUCTION

On October 30, 2003, Roseville Electric (RE or applicant) filed an Application for Certification (AFC), for its proposed Roseville Energy Park (REP) with the California Energy Commission seeking approval to construct and operate a 120 to 125 megawatt (MW) natural gas-fired, combined-cycle electric generating facility. The plant would be owned and operated by RE. The facility would have the ability to operate at 160 MW (nominal) during summer design conditions. The Energy Commission determined the application to be data adequate on December 17, 2003. This determination initiated staff's independent analysis of the proposed project. On October 1, 2004, the applicant filed a supplemental Project Description that encompassed changes to the project made during the review of the AFC.

The REP and related facilities, such as natural gas pipelines, are under the Energy Commission's jurisdiction. When issuing a license, the Energy Commission acts as lead state agency under the California Environmental Quality Act (CEQA), and its process is certified by the State Resources Agency as a separate program that satisfies the core CEQA requirements.

ROSEVILLE ENERGY PARK

The REP would be located on a 8.9-acre site that lies within a 40-acre City of Roseville parcel. The project site is within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The project site is owned by the City of Roseville and is zoned Public/Quasi-Public. Surrounding land uses currently include ranching (agricultural grazing) and rural residential. The project area to the south, east, and west, however, is proposed for residential, industrial, and commercial development under the West Roseville Specific Plan (WRSP). The WRSP is a plan for annexation and development of 3,162 acres and was approved by the City Council in February, 2004. Build-out of the WRSP will take place over approximately 15 years. **PROJECT DESCRIPTION Figure 1** shows the regional setting and **PROJECT DESCRIPTION Figure 2** provides the local setting for the proposed project.

PROJECT EQUIPMENT AND LINEAR FACILITIES

As proposed, the REP power train would consist of the following: 1) two General Electric LM6000 PC SPRINT or Alstom GTX100 combustion turbine-generators (CTGs), equipped with water injection (for the LM6000) or dry low-NO_x combustors (for the GTX100) to control oxides of nitrogen (NO_x) and evaporative coolers for reducing inlet air temperatures; 2) two heat recovery steam generators (HRSGs) with duct burners; 3) selective catalytic reduction (SCR) and oxidation catalyst equipment to control NO_x and carbon monoxide (CO) emissions, respectively; 4) a single condensing steam turbine generator (STG); 5) a deaerating surface condenser; 6) a mechanical draft cooling tower; and 7) associated support equipment.

Each CTG would generate approximately 43 to 47 MW at annual average ambient conditions. The CTG exhaust gases would be used to generate steam in the HRSGs. The HRSGs would employ a two-steam-pressure design with duct firing equipment. Steam from the HRSGs would be admitted to a condensing STG. The STG would produce approximately 75 to 87 MW under average annual ambient conditions with HRSG duct firing. The project is expected to have an overall annual availability of approximately 95 percent.

Associated equipment includes the emission control systems needed to meet the proposed emission limits for oxides of nitrogen ($NO_{x)}$, a maximum of 2.0 (average basis) parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen, by a combination of water-injected or dry low NO_x combustors in the CTGs and SCR systems in the HRSGs. Carbon monoxide (CO) would be controlled to a maximum of 4.0 ppmvd at 15 percent oxygen under all operating conditions by means of an oxidation catalyst except startup and shutdown periods.

Natural Gas Facilities

The REP would be designed to burn only natural gas. Natural gas would be delivered to the site via a new pipeline to be designed, constructed, and owned by PG & E. There are only two alternative routes under consideration by the applicant, Alternative "A" and Alternative "D". Both routes were analyzed in this final Staff Assessment. Alternative "A" pipeline would extend from its interconnection to PG&E's Line 123 near the corner of Baseline and Country Club roads. The pipeline would travel west along Baseline Road and turn north along Fiddyment Road. At the intersection with Blue Oaks Boulevard, the route turns west into the WRSP area and continues along the future extension of Blue Oaks Boulevard. The pipeline would then turn south into the future alignment of Phillip Road and then west on the existing alignment of Phillip Road. The pipeline would then turn into the REP site at the gas metering station. **PROJECT DESCRIPTION Figure 2** depicts the proposed alignment for the natural gas pipeline. This gas line route was chosen by the applicant in order to avoid the 1,500 foot distance criterion established by the California Department of Education for placement of hazardous materials (i.e., natural gas) within close proximity of proposed school sites designated in the West Roseville Specific Plan.

Construction of the pipeline would be primarily by open trench. However, where the pipeline crosses busy paved roads, jack and bore techniques may be used for the crossing. The crossing of Kaseberg Creek would use horizontal directional drill (HDD) techniques.

Alternative D replaces Alternatives B, B1, and C described in the AFC as filed in October 2003. Alternative D begins near the corner of future Pleasant Grove Boulevard and future West Side Drive, as these roadways are described in the WRSP (Figure 5.1-1). It travels north along the east side of West Side Drive, running in a 35-foot-wide utility easement that has been planned as part of the WRSP. Just north of Pleasant Grove Boulevard, the route diverges from West Side Drive, running due north in the utility easement. This route crosses areas planned for residential, open space, and light and general industry in the WRSP, running north for approximately 1.2 miles to Phillip Road along the western boundary of the Pleasant Grove Waste Water Treatment Plant. At Phillip Road, the route turns east, running in Phillip Road to the gas metering station

located in the southeast corner of the power plant site. The length of Alternative D is 1.5 miles.

PG&E has proposed Alternative D as a more practicable and cost-effective alternative routing for the project than Alternative A. This new routing would be consistent with PG&E's planned distribution system for the future growth in West Roseville. Based on an analysis of projected future demand for natural gas in West Roseville, PG&E plans to install a gas distribution feeder main between distribution line 123 and a new distribution regulation station to be located near the intersection of Pleasant Grove Boulevard and West Side Drive. The REP's first point of interconnection would be the new PG&E distribution feeder main at Pleasant Grove Boulevard. To serve the REP, PG&E would tap the distribution feeder main and install a 10-inch pipeline to the REP. The proper construction of this line would be insured by our recommended Conditions of Certification and overseen by the Compliance Project Manager.

Under average ambient conditions the REP would consume 19,820 million Btu per day, lower heating value, without HRSG duct firing.

Water Supply and Waste Water Treatment

The City of Roseville would provide the industrial process water supply for the REP from the PGWWTP. The PGWWTP would supply tertiary-treated, recycled water to meet cooling and other process makeup, landscape irrigation, and fire fighting requirements.

Water required for potable uses would initially be provided from an existing well located on the REP site. The City of Roseville potable water distribution system would eventually be extended to serve the area surrounding the REP site as part of the build-out of the WRSP. When this occurs, the REP's potable water system would be connected to the City water main and the on-site well would be disconnected

A more detailed description of the water supply system, treatment, and permits is provided in **Soil and Water Resources** section of this Final Staff Assessment.

Electric Transmission

Electricity produced by the facility would be transmitted to RE grid. The generator output would be connected to three generator step-up transformers which would increase the voltage to 60 kV. Each transformer would then connect to the REP switchyard. From the switchyard, power would be transmitted to RE's grid by looping a new 60 kV transmission line into the REP switchyard. This new 60 kV line, constructed as part of the West Roseville Specific Plan (WRSP) build-out, would be a double-circuit line running from RE's Fiddyment Receiving Station to a new WRSP substation and passing adjacent to the REP. The new WRSP 60 kV lines would be routed along the south boundary of the REP site. A detailed discussion of the transmission system is provided in **Transmission System Engineering** section of this Final Staff Assessment.

PROJECT CONSTRUCTION

Construction of the REP would take place over approximately 15 months, from Spring 2005 to the Summer of 2006. Plant testing is expected to commence in the Fall of 2006, with commercial operation expected in the Summer of 2007.

FACILITY CLOSURE

The REP would be designed for an operating life of 30 years. At some point in the future, the project would cease operation and close down. At that time, it would be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

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

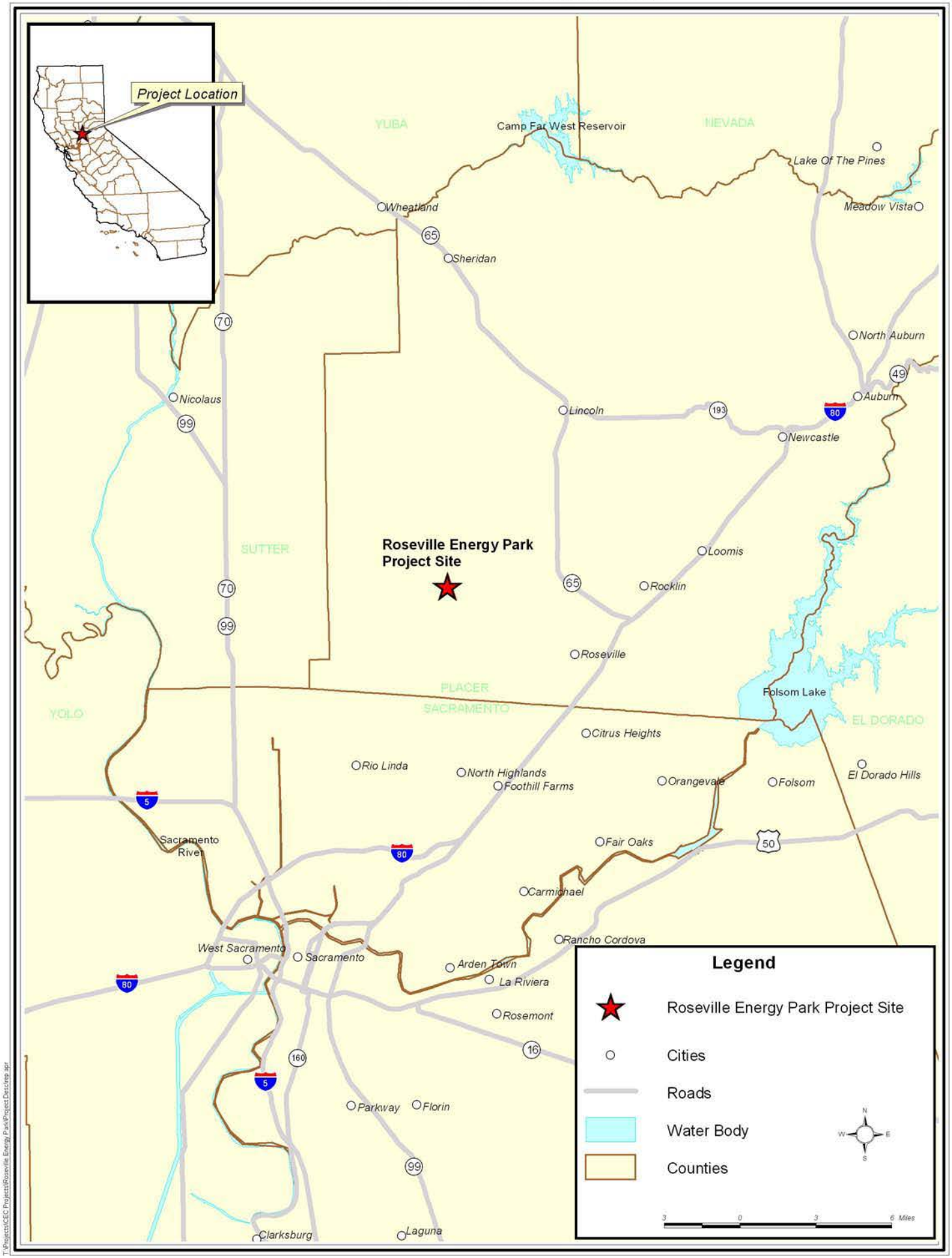
REFERENCES

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

CH2MHill, Sacramento, California (CH2MHill) 2004k. Supplemental Project Description to the Application for Certification. Submitted to the Docket on October 1, 2004.

PROJECT DESCRIPTION - FIGURE 1

Roseville Energy Park Project Site - Regional Location

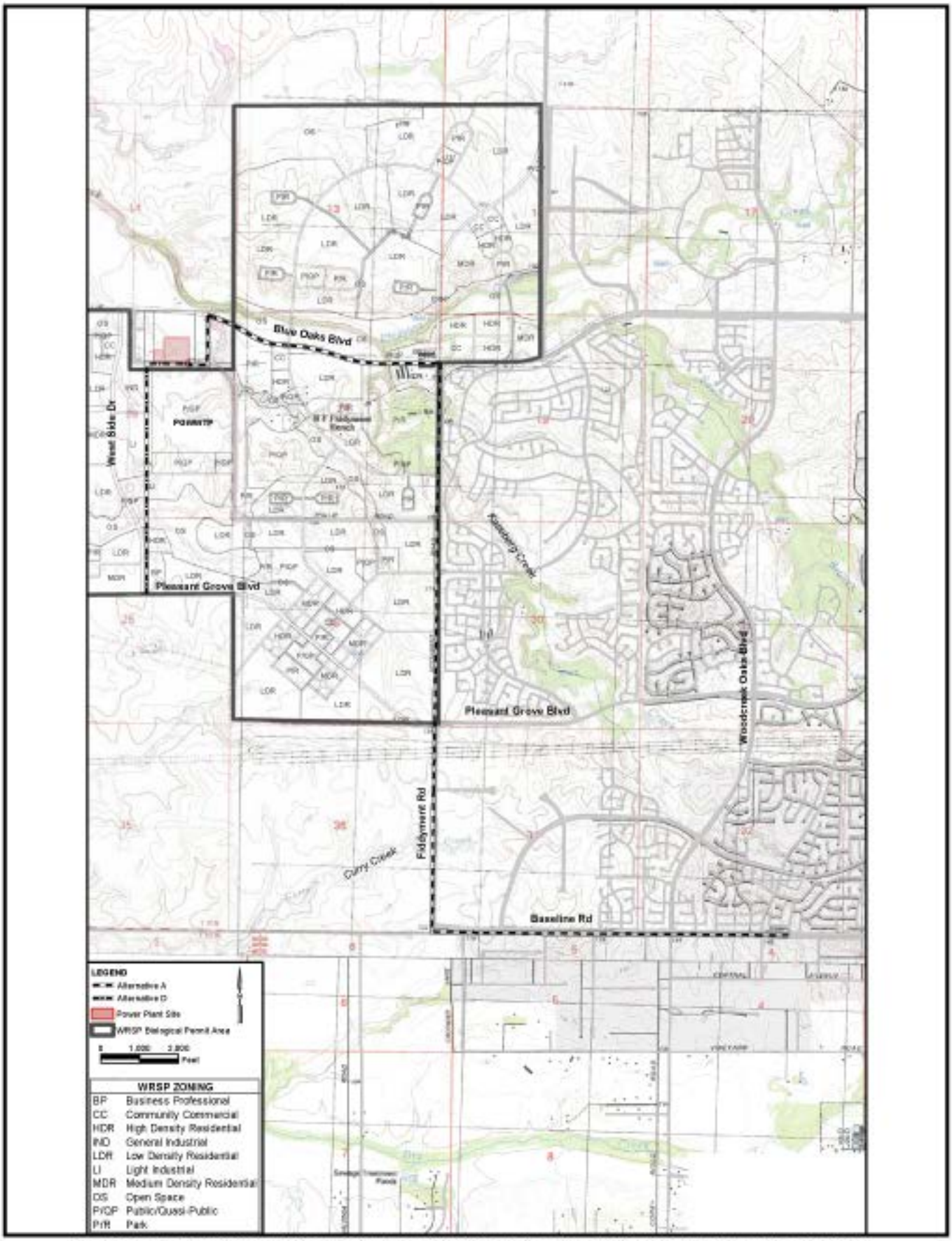


CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2004

PROJECT DESCRIPTION - FIGURE 2

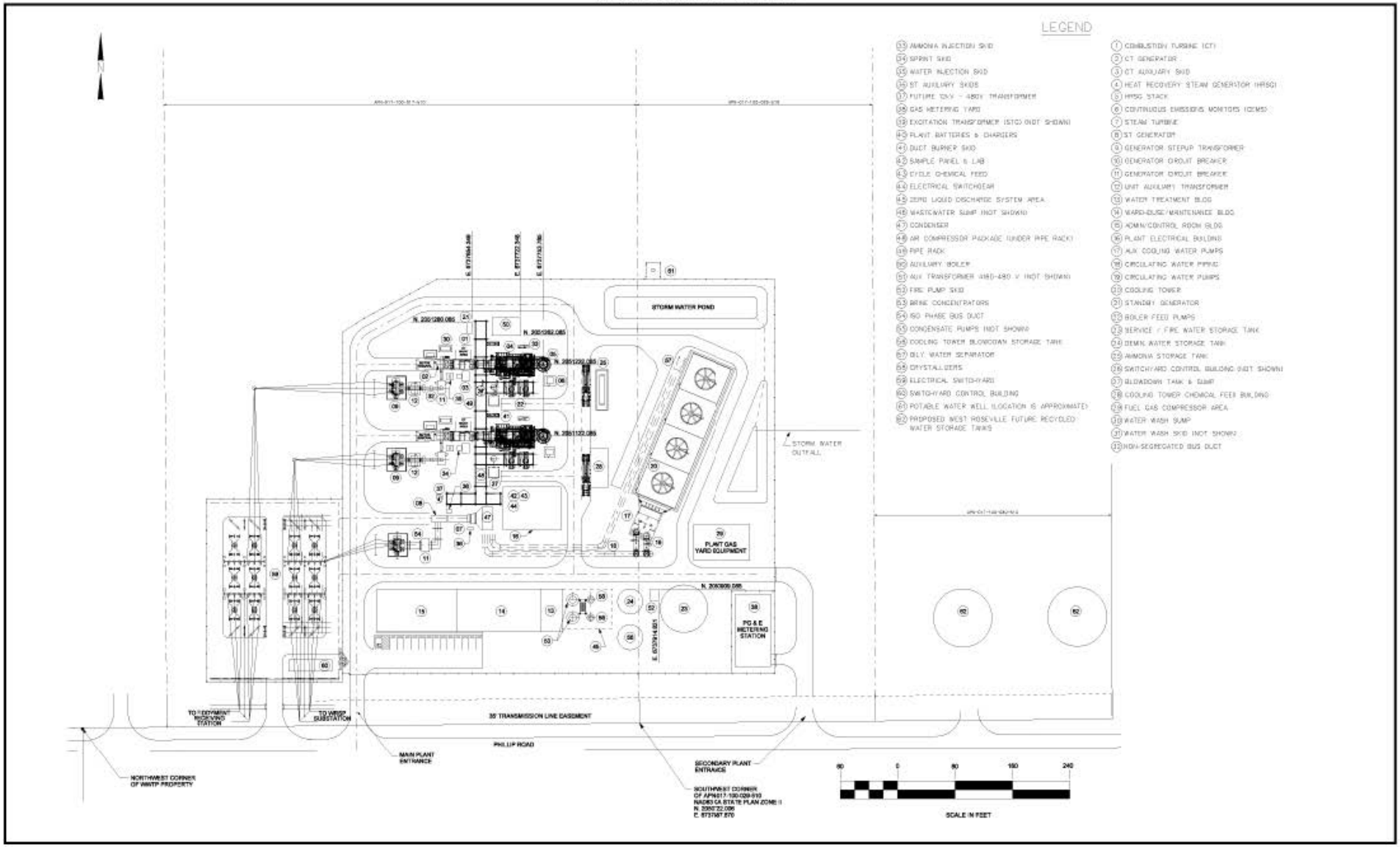
Roseville Energy Park - Pipeline Alternatives and WRSP Zoning



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: 03-AFC-01 Supplemental Information - Figure 5.1-1

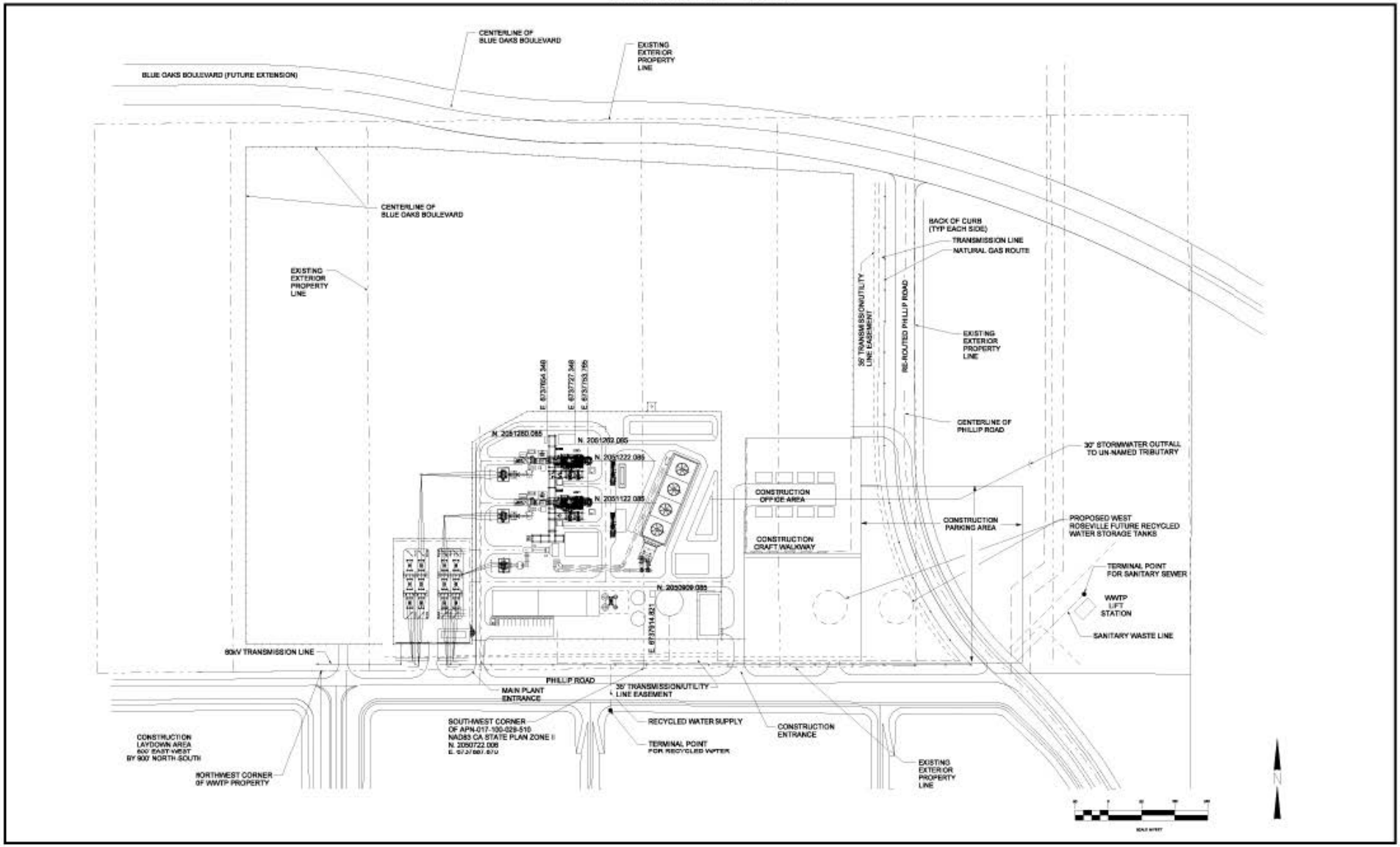
PROJECT DESCRIPTION - Figure 3a
Roseville Energy Park - Site Layout



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: 03-AFC-01 Supplemental Information - Figure RE-S-1001

PROJECT DESCRIPTION - Figure 3b

Roseville Energy Park - Site Plan



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: 03-AFC-01 Supplemental Information - Figure RE-S-1002

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Joseph M. Loyer

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the planned construction and operation of the Roseville Energy Park (REP) as proposed by Roseville Electric (RE), the City of Roseville's electric utility. Criteria air pollutants are defined as those for which a state or federal ambient air quality standard has been established to protect public health. They include nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), volatile organic compounds (VOC) and particulate matter less than 10 microns in diameter (PM10) and less than 2.5 microns in diameter (PM2.5).

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

- whether the REP is likely to conform with applicable Federal, State and Placer County Air Pollution Control District (PCAPCD or District) air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations (CCR), section 1744 (b);
- whether the REP is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, CCR, section 1742 (b); and
- whether the mitigation proposed for the REP is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, CCR, section 1742 (b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Under the Federal Clean Air Act (40 CFR 52.21), there are two major components of air pollution law, New Source Review (NSR) and Prevention of Significant Deterioration (PSD). NSR is a regulatory process for the evaluation of those pollutants that violate the federal ambient air quality standards. Conversely, PSD is a regulatory process for the evaluation of pollutants that do not violate the federal ambient air quality standards. The NSR analysis has been delegated by the U.S. Environmental Protection Agency (U.S. EPA) to the Placer County Air Pollution Control District (District). The U.S. EPA determines the conformance with the PSD regulations. The PSD requirements apply only to those projects that emit pollutants in excess of 100 tons per year (known as major sources).

STATE

The California State Health and Safety Code, section 41700, requires that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerate

number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

LOCAL – PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

The proposed project is subject to all PCAPCD rules and regulations that the Air Pollution Control Officer finds to be applicable. The applicability of these rules and regulations are discussed fully in the Preliminary Determination of Compliance (PDOC) issued by the District on May 25, 2004 (PCAPCD 2004a). These rules and regulations include common prohibitions against visibility impairment and nuisance from air emissions, as well as, specific NSR procedural requirements. While it is required that REP comply with all applicable rules and regulations, the District NSR rule is the most relevant for the REP.

Rule 502 – New Source Review

This rule codifies the scope, process and requirements for the District to issue a Determination of Compliance (DOC), Authority to Construct (ATC) and a Permit to Operate (PTO) within the California Energy Commission's (Commission) California Environmental Quality Act (CEQA) equivalent process. This rule includes the requirement for determining the Best Available Control Technology (BACT) for the class and category of emitting device. It includes the standard for establishing emission limits on an hourly, daily and quarterly basis and establishes precursor pollutants, offset triggers, offset ratios, and distance ratios needed for the determination of offsetting requirements. Additionally, this rule establishes the ability of the Air Pollution Control Officer to determine an appropriate interpollutant trading ratio.

ENVIRONMENTAL SETTING

METEORLOGICAL CONDITIONS

The general climate of California is typically dominated by the eastern pacific high pressure system centered off the coast of California. In the summer, this system results in low inversion layers with clear skies inland and typically early morning fog by the coast. In winter, this system promotes wind and rainstorms originating in the Gulf of Alaska and striking Northern California.

The climate of California's Central Valley is characterized as Mediterranean with overall moderate annual temperatures and precipitation occurring primarily in the winter months. The Sacramento Valley Air Basin, located in the northern portion of the Central Valley, experiences summer high temperatures of up to 115^{o} F and winter lows to 15^{o} F with annual precipitation of approximately 23 inches in the vicinity of the REP site.

The REP site is located approximately five miles northwest of the City of Roseville, adjacent to the Pleasant Grove Waste Water Treatment Plant. The surrounding topography is typified by flat to rolling hills in all directions and is approximately 95 feet above mean sea level in elevation.

The prevailing daylight wind patterns are from the south or south-southeast and diurnal winds from the north or north-northwest with an overall annual average windspeed of 3.5 meters per second. The relative humidity ranges from 30 to 90 percent with occasional lingering heavy fog in the winter months.

EXISTING AIR QUALITY

The Federal Clean Air Act and the California Clean Air Act both require the establishment of allowable maximum ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by California Air Resources Board (CARB), are typically lower (more restrictive) that the federal AAQS, which are established by the U.S. EPA. The state and federal air quality standards are listed in **AIR QUALITY Table 1**. As indicated in **AIR QUALITY Table 1**, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to an annual average. The standards are read as a concentration, in parts per million or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter (mg/m^3 and ug/m^3).

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

The REP is located in the City of Roseville and is under the jurisdiction of the Placer County Air Pollution Control District. **AIR QUALITY Table 2** shows the attainment or non-attainment status of the District for each criteria pollutant for both federal and state ambient air quality standards.

Federal Non-Attainment Pollutants

Ozone (O_3) is not directly emitted from a stationary or mobile source. It is formed as a result of chemical reactions in the atmosphere between NOx and VOC emissions that interact in the presence of sunlight. Ozone formation occurs in the Sacramento Region, primarily northeast of the Sacramento downtown area between Roseville and Auburn. **AIR QUALITY Figure 1** is a graphical representation of the relative ambient ozone concentration levels measured at 22 ambient air quality monitoring stations. The numeric values are in terms of Air Quality Index (API) and not actual ozone concentrations; however, API is calculated in proportion to ozone measurements in addition to other factors. Thus, the differences in color show the relative ozone concentrations, while the values show the actual API.

AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O3)	8 hour	0.08 ppm (157 ug/m^3)	---
	1 hour	0.12 ppm (235 ug/m^3)	0.09 ppm (180 ug/m^3)
Carbon Monoxide (CO)	8 hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 ug/m^3)	---
	1 hour	---	0.25 ppm (470 ug/m^3)
Sulfur Dioxide (SO_2)	Annual Average	3 ppm (80 ug/m^3)	---
	24 hour	0.14 ppm (365 ug/m^3)	0.04 ppm (105 ug/m^3)
	3 hour	0.5 ppm (1300 ug/m^3)	---
	1 hour	---	0.25 ppm (655 ug/m^3)
Fine Particulate Matter (PM10)	Annual	50 ug/m^3	20 ug/m^3
	24 hour	150 ug/m^3	50 ug/m^3
Ultra Fine Particulate Matter (PM2.5)	Annual	15 ug/m^3	12 ug/m^3
	24 hour	65 ug/m^3	---
Sulfates (SO4)	24 hour	---	25 ug/m^3
Lead	30 Day Average	---	1.5 ug/m^3
	Calendar Quarter	1.5 ug/m^3	---
Hydrogen Sulfide (H_2S)	1 hour	---	0.03 ppm (42 ug/m^3)
Vinyl Chloride (chloroethene)	24 hour	---	0.010 ppm (26 ug/m^3)
Visibility Reducing Particulates	1 observation	---	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

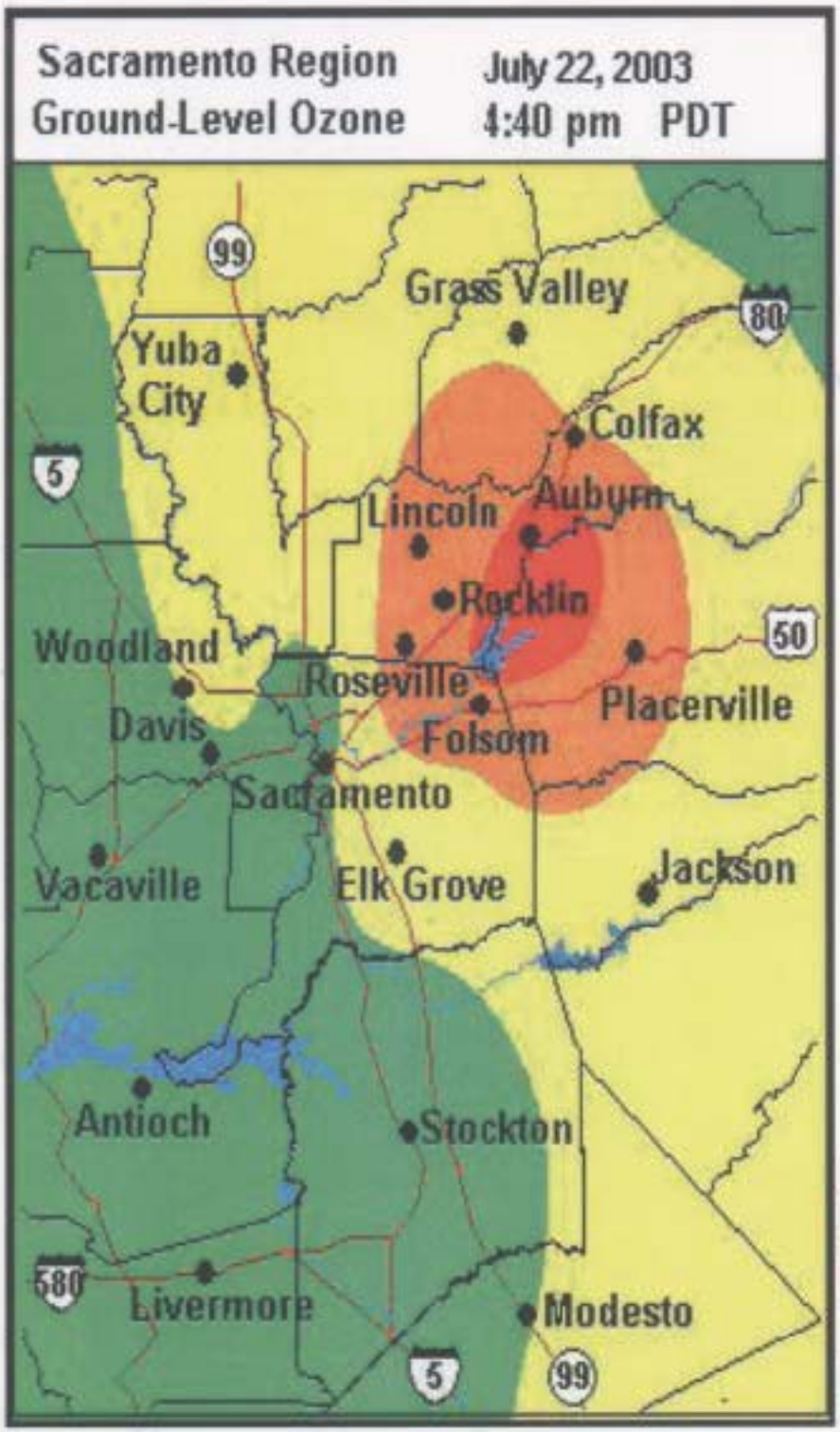
AIR QUALITY Table 2
Attainment/ Non-Attainment Classification
Placer County Air Pollution Control District

Pollutants	Federal Classification	State Classification
Ozone 1-hour	Non-Attainment	Non-Attainment
Ozone 8-hour	Non-Attainment	---
PM10	Unclassified	Non-Attainment
PM2.5	Designation recommended by CARB to be Attainment	Non-Attainment
CO	Attainment	Unclassified
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

AIR QUALITY Figure 1 is an example of an ozone excursion, a day when pollution levels exceed the federal ozone ambient air quality standards. These excursions were registered at ambient air quality monitoring stations from Roseville to Auburn (the orange and red zones). While this is a graphic representation of a specific day and time, it is representative of days when ozone exceedances occur. Full animations of this day and other days are available at www.SparetheAir.com.

AIR QUALITY - FIGURE 1

Roseville Energy Project- Example of Ozone Excursion - Sacramento Region



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Sacramento Metropolitan Air Quality Management District and the air districts of the Sacramento region. Copyright 2003-2004. Ozone Movie Archive, July 22, 2003 at 4:40 PM. Note that values are represented in terms of Air Quality Index, not ozone concentration.

New Ozone and PM Standards

As indicated in **AIR QUALITY Table 2**, an attainment designation has been ratified by EPA for the District for the federal 8-hour ozone standard and an attainment designation has been proposed for the federal PM2.5 standard. However, a State Implementation Plan (SIP) has not been developed or ratified as of this date. Until the 8-hour Ozone and (PM2.5 for other areas) Attainment Plan is developed and ratified, it is assumed that the state will rely on the implementation of the 1-hour ozone SIP. The California Air Resources Board (CARB) is actively developing (with local air districts and other agencies) both an 8-hour ozone and PM (PM10 and PM2.5) SIP for those areas that are designated federal non-attainment. Furthermore, CARB (as directed under Senate Bill 656) is developing a list of measures for reducing PM (PM10 and PM2.5) by January 1, 2005. CARB, local air districts and other state agencies will adopt related implementation schedules by July 31, 2005. The goal is to make progress toward attainment of state and federal PM10 and PM2.5 standards. The proposed control measures are to be based on rules, regulations, and programs existing in California as of January 1, 2004 to reduce emissions from new, modified, or existing stationary, area, and mobile sources.

Local Air Quality Monitoring

The project location on **AIR QUALITY Figure 1** is indistinguishable from the dot representing the City of Roseville. The closest ambient air quality monitoring stations to the project location are at North Highlands on Blackfoot Way (to the southwest), the Roseville station on N. Sunrise Blvd (to the northeast) and at Rocklin on Rocklin Rd (further northeast). After extensive review of the available ambient air quality monitoring data from these three stations, staff recommends measurements in **AIR QUALITY Table 3** to be reasonably representative of the expected background ambient air quality. A more detailed discussion of the available data is presented in **Appendix A**.

The background ambient air quality data shows current violations of the 1-hour and 8-hour ozone federal ambient air quality standards (as well as the 1-hour ozone state ambient air quality standard). Additionally, the background data shows violations of the PM10 24-hour, PM10 annual and PM2.5 annual state ambient air quality standards. Finally, the background data shows that there are no violations of the NO_2, SO_2 or CO state or federal ambient air quality standards.

AIR QUALITY Table 3
Staff Recommended Background Pollution Concentrations

Pollutant	Averaging Time	Measurement ug/m^3	ppm	Station	Date
Ozone	8-hour	233	0.119	Rocklin	1998
	1-hour	300	0.153	Roseville	1998
PM10	Annual	25.2	--	Roseville	2002
	24-hour	62.0	--	Roseville	2001
PM2.5	Annual	13.4	--	Roseville	1999
	24-hour	53	--	Roseville	2002
CO	8-hour	3,122	2.81	Roseville	2002
	1-hour	5,257	4.6	Roseville	2002
NO_2	Annual	30.2	0.016	Roseville	2002
	1-hour	182.4	0.097	Roseville	1998
SO_2	Annual	0.05	0.002	North Highlands	2002
	24-hour	28.7	0.011	North Highlands	2001
	3-hour	31.2	0.012	North Highlands	2001
	1-hour	49.8	0.019	North Highlands	2002

Source: California Air Resources Board

Ammonia Inventory

PM10/PM2.5 can be formed downwind from an emission source as a secondary emission (similar to ozone) from a reaction between ammonia and airborne acids. The most dominant reactions are between SOx emissions (as sulfuric acid, H_2SO_4) and NOx emissions (as nitric acid, HNO_3). The complexity of these reactions arises from the formation of gaseous, liquid and solid forms of the products and reactants involved. The qualitative understanding of these reactions indicates that all the available ammonia will be reacted with all the available sulfuric acid prior to any ammonia being reacted with any available nitric acid (Seinfeld 1986). From this presumption, two cases of interest arise. The sulfate rich case (or ammonia limited), where the molar ratio of ammonia (NH_3) to sulfate (SO_4) is less than two, so that there is insufficient ammonia to react with the sulfate. The ammonia rich case, where the molar ratio of ammonia to sulfate is greater than two, so that the sulfate is completely reacted and there is excess ammonia (Seinfeld 1986).

For the purpose of determining the secondary PM10/PM2.5 potential impacts, it is necessary to determine first, if the area is either ammonia rich or ammonia limited as discussed above, and second, to determine what additional ammonium sulfate and ammonium nitrate are likely to form. Lastly, those impacts must be compared to the existing background measurements. Unfortunately, no information is available to complete any of these steps. What can be done is to determine if the potential exists for ammonia, SOx and NOx emissions from the proposed REP facility to contribute to an existing violation of the PM10 or PM2.5 state ambient air quality standards.

There is no ammonia inventory data available for Placer County. However, from ammonia inventories of other counties and air districts (as well as the state inventory), it is clear that such inventories are dominated by livestock (45 percent statewide), on-road mobile (19 percent statewide) and composting, fertilizers, and other agricultural sources

(19 percent statewide). Currently, there are two ammonia inventories available from CARB in addition to the state inventory: San Joaquin Valley Air Pollution Control District (2000) and South Coast Air Quality Management District (2000). Staff has modified the San Joaquin inventory slightly such that, in staff's opinion, the resulting inventory is a reasonable estimate of what the Placer County ammonia inventory might be.

Staff investigated available data that might be used to alter the existing ammonia inventories as well as ambient air quality data that might show evidence of ammonia trends. These sources included ambient air quality monitoring data from the past five years, livestock counts, farming inventories, economic, and population estimates. However, only the economic and population data were explicit enough to Placer County and the Roseville area to be useful and the ambient air quality monitoring data was inconclusive. The economic and population data showed that less than one percent of employees in Placer County are engaged in the Agricultural sector while Trade, Transportation, & Utilities sector makes up close to 20 percent of the county's total employment in 2002 (SRRI 2004). Therefore, it is reasonable to assume that the Placer County ammonia inventory (if one existed) would not have significant contributions from livestock or agricultural sources. That leaves on-road mobile sources as the only major contributor to a Placer County ammonia inventory. Staff eliminated the majority of the livestock, composting and fertilizer contributions from the San Joaquin Valley ammonia inventory so that it could be used as a proxy to more closely reflect the expectations of a Placer County ammonia inventory. Thus, staff estimates the ammonia inventory to be approximately 36 tons/day (for further discussion, see **Appendix B**).

In comparison to the ammonia rich areas of San Joaquin Valley (368.7 tons/day) and the South Coast (181.7 tons/day), the estimated ammonia inventory of Placer County (36 tons/day) leads staff to presume that the area is most likely ammonia limited. Thus, as discussed above, it is likely that the release of further ammonia would lead to further PM10/PM2.5 formation downwind. However, it is not possible to determine the rate at which this could occur with the available information. Therefore, staff concludes that the release of ammonia slip from the REP facility has a high likelihood of forming additional PM10/PM2.5 downwind and thus contributing to an existing violation of the PM10 or PM2.5 state ambient air quality standards.

PROJECT DESCRIPTION AND EMISSIONS

CONSTRUCTION

Project Site

The REP facility will take approximately 20 months to construct. The power plant project construction consists of three major areas of activity: 1) the civil/structural construction; 2) the mechanical construction; and 3) the electrical construction. The largest fugitive dust emissions are generated during the civil/structural activity, where work such as demolition, grading, site preparation, foundations, underground utility installation and building erection occur. These types of activities require the use of large earth moving equipment, which generate considerable fugitive dust and combustion emissions. The mechanical construction includes the installation of the heavy equipment, such as the

combustion and steam turbines, the heat recovery steam generators, condenser, pumps, piping and valves. The use of large cranes to install such equipment generates significantly more combustion emissions than other construction equipment onsite. Finally, the electrical equipment installation involves such items as transformers, switching gear, instrumentation and wiring. This is a relatively small emission-generating activity in comparison to the early construction activities.

The City of Roseville currently utilizes the proposed site for the REP facility for equipment storage and laydown area. The proposed REP site is approximately seven acres, with the majority of the construction activities focused on three acres (Roseville 2003b). The small amounts of demolition, grading and site preparation coupled with the mitigation measures that the applicant has agreed to are not expected to result in a significant amount of fugitive dust. The applicant also offered construction mitigation measures to reduce both fugitive dust and combustion PM10. **AIR QUALITY Table 4** shows the expected emissions from construction activities at the site with the following mitigation measures employed as proposed by the RE:

- Watering all unpaved roads and disturbed areas in the project and linear construction sites as necessary to prevent fugitive dust plumes.
- Limiting construction site speed to 10 miles per hour.
- Inspecting and washing vehicle tires so they are free of dirt prior to entering paved roadways.
- Using gravel or other roadway stabilizers as necessary.
- Using sandbags or other measures to prevent run-off to roadways.
- Covering or stabilizing all soil storage piles and disturbed areas.
- All transport solid bulk will be provided with a cover, or provide at least one foot of freeboard.
- Employing wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed.

Linear Facilities

The linear facilities will include 6.4 miles of new natural gas pipeline, approximately 6.6 miles of transmission line and approximately 100 feet of reclaimed water pipeline. Given that the linear construction elements are short, staff has estimated that they will result in the minor emissions shown in **AIR QUALITY Table 5** with the assumptions shown.

AIR QUALITY Table 4
Estimated Construction Emissions

	NOx	CO	VOC	SOx	PM10
Daily (lbs/day)					
Combustion Equipment	291.2	360.7	52.2	23.9	17.0
Fugitive Dust	--	--	--	--	4.52
Annual (tons/year)					
Combustion Equipment	10.8	35.7	4.4	0.6	1.0
Fugitive Dust	--	--	--	--	0.60
Total (20 month) Construction Period (tons/year)					
Combustion Equipment	18.0	59.5	7.3	1.0	1.65
Fugitive Dust	--	--	--	--	1.0
Note: Combustion emissions include construction equipment, truck and rail deliveries, and worker transportation. Fugitive dust emissions include emissions from construction activities, truck and rail deliveries and worker travel.					

Source: (Roseville 2003a)

AIR QUALITY Table 5
Estimated Total (2 Months) Linear Construction Emissions
(Tons)

	NOx	CO	VOC	SOx	PM10
Combustion Equipment	2.2	1.2	0.2	0.2	0.2
Fugitive Dust	--	--	--	--	0.4
Notes: Assumes the operation of four backhoes and two dump trucks, eight hours per day, 22 days per month for a total duration of two months and one acre of soil disturbance with no fugitive dust mitigation measures.					

OPERATION

RE is proposing to license two optional power plant configurations, one based on the GE LM6000 combustion turbine, and the other based on the Alstom GTX100 turbine. Both are proposed to be a two-on-one design, which comprises two combustion turbines with supplemental duct fired heat recovery steam generators and one steam generator. Both options will be designed to reach a nominal capacity of approximately 120 to 125 MW with peak capability (including the duct burners) of 160 MW.

Equipment Description

The major equipment at the REP facility will include one of the following two options:

Option	Turbine	Duct firing at the HRSG	Steam Generator
1	GE LM6000 PC Sprint Input heat rate: 446.8 MMBtu/hr Nominal output: 47 MW Water Injected Combustors	Input heat rate 255 MMBtu/hr	Nominal Output 30 MW
2	Alstom GTX100 Input heat rate: 457.3 MMBtu/hr Nominal output: 43 MW Dry Low-NOx Combustors	Input heat rate 225 MMBtu/hr	Nominal Output 43 MW

Both options will include the following equipment:

- Two 120 feet high exhaust emission stacks to be directly preceded by ammonia injection into a selective catalytic reduction (SCR) and an oxidation catalyst;
- One auxiliary natural gas-fired boiler rated at 58 MMBtu/hr input heat rate and an output of 40,000 lbs steam per hour (600 psig);
- One 1,133 horsepower (hp) 750 kW diesel-fire emergency generator;
- One 300 hp diesel-fired firewater pump; and
- One four-cell cooling tower, with 54,414-gpm throughput and 0.0005percent drift rate.

Equipment Operation

RE has proposed the operational schedule shown in **AIR QUALITY Tables 6a, 6b** and **6c** for the REP facility.

AIR QUALITY Table 6a
Proposed Power Plant Operational Schedule
(Hours)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
Base load Operation per Turbine	1,123	1,188	751	852	3,914
Peak Load Operation per Turbine/HRSG	929	559	1,347	1,246	4,081
Startup and Shutdown per Turbine	44	117	34	47	242
Total Hours of Operation per Turbine	2,096	1,864	2,132	2,145	8,237
Auxiliary Boiler	140	568	143	143	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Firewater Pump	12.5	12.5	12.5	12.5	50

Source (Roseville 2003b)

The REP facility is assumed to operate at a base load of approximately 120 to 125 MW firing both combustion turbine generators (CTGs) with no duct firing and a peak load of

160 MW with duct firing. Startup will consist of 167 hot starts (one-hour duration), 30 warm starts (two-hour duration) and five cold starts (three-hour duration) for a total of 242 hours of startup for each turbine.

The auxiliary boiler is proposed to provide steam when the CTGs are not operating, but not for the purpose of generating electric power. It will provide steam for HRSG drum sparging, condenser hotwell sparging, steam turbine glands, and deaeration when the plant is offline. The firewater pump and emergency generator are to be used in emergency conditions and will be tested weekly running 30 minutes for each test.

Because the REP facility has not been able to find sufficient NO_2 Emission Reduction Credits (ERCs) for the operational scenario in **AIR QUALITY Table 6a**, RE has proposed to accept a limiting condition on the REP facility NOx emissions. The NOx limit proposed by the District in their Final Determination of Compliance (FDOC) is based on the emissions of the LM6000 combustion turbine and the operational profile shown in **AIR QUALITY Table 6b**. This NOx emission limit presumes that RE will provide another 10 tons of NO_2 ERCs from post-combustion controls that are to be added to a local landfill-gas-to-energy operation (discussed in more detail in the Proposed Mitigation section). RE also submitted an operational profile that considers only the NO_2 and VOC ERCs that they currently own of for which they have purchase agreements traded for NO2 ERCs (shown in **AIR QUALITY Table 6c**).

AIR QUALITY Table 6b
Power Plant Operational Profile
Corresponding to a NOx Emission Limit of 31.1 tons/year
(Hours)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
Base load Operation per Turbine	1,324	1,094	1,247	1,298	4,963
Peak Load Operation per Turbine/HRSG	500	321	849	509	2,179
Startup and Shutdown per Turbine	89	148	30	94	361
Total Hours of Operation per Turbine	1913	1563	2126	1901	7503

AIR QUALITY Table 6c
Power Plant Operational Profile
Corresponding to a NOx emission Limit of 23.4 tons/year
(Hours)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
Base load Operation per Turbine	1,304	761	1,240	1,238	4,543
Peak Load Operation per Turbine/HRSG	183	13	563	166	925
Startup and Shutdown per Turbine	27	106	92	136	361
Total Hours of Operation per Turbine	1,514	880	1,895	1,540	5,829

Equipment Controls

The exclusive use of an inherently clean fuel, natural gas, will limit the formation of SO_2, PM2.5 and PM10 emissions. Natural gas contains very small amounts of a sulfur compound known as mercaptan, which when combusted, results in sulfur compound emissions of SO_2 in the flue gas. However, in comparison to other fuels used in power plants, such as fuel oil or coal, the sulfur content of natural gas is very low. Similar to SO_2, the emissions of PM2.5 and PM10 from natural gas combustion are very low compared to the combustion of fuel oil or coal. Natural gas contains very little noncombustible gas or solid residue; therefore, it is a relatively clean-burning fuel.

CO and VOC emissions will be controlled through the application of an oxidizing catalyst. NOx emissions will be controlled through ammonia injection in conjunction with SCR. In addition to these post-combustion controls, the GTX100 turbines will employ Dry Low-NOx combustors and the LM6000 turbines will employ water injection into the combustors to reduce the formation of NOx emissions.

Operating Emissions

AIR QUALITY Table 7a shows the maximum expected air emissions as proposed by RE. The estimated maximum expected emissions from the REP facility are based on the following assumptions (for further discussion, see **Appendix C**).

Maximum Hourly Emissions

The highest emissions of NOx, VOC and CO, for either of the proposed REP turbines/HRSG trains would occur during the startup sequence. For the maximum emissions of PM10 and SO_2, the REP turbines/HRSG trains would both be in peak load operation. The auxiliary boiler is assumed to be at full potential output and the cooling tower at full operational load. Both the emergency generator and the firewater pump are assumed to be in standby mode (not operating) during all startup procedures.

AIR QUALITY Table 7a
Maximum Expected Operational Emissions

	NOx		SO_2		CO		VOC		PM10	
	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100	LM6000	GTX100
Hourly (lbs/hr)	49.7	122.8	2.14	2.21	42.2	204.8	3.9	39.8	10.6	10.8
Daily (lbs/day)	291.5	428.8	48.21	49.3	354.5	683.2	89.9	229.4	252.4	257.6
Quarterly (tons/quarter)[A]										
Quarter 1	see Tables 7b and 7c		3,331	3,400	21625	27121	6,046	5,832	17523	17673
Quarter 2			2,838	2,893	19737	33872	5,188	7,455	15246	15513
Quarter 3			3,630	3,709	23500	28515	6,596	6,672	18999	19168
Quarter 4			3,587	3,663	23322	30202	6,514	6,890	18788	19158
Annual (tons/year)			6.69	6.83	44.09	59.86	12.17	13.42	32.28	35.95

Source: (Roseville 2003b)
A - Quarterly and annual emissions of SO2, CO, VOC and PM10 are based on the operational profile shown in AIR QUALITY Table 6a.

Maximum Daily Emissions

For the highest daily emissions of NOx, CO, and VOC (from the GTX100 only), the REP turbine/HRSG trains are assumed to have one cold start (three hour duration), one warm start (two hour duration) and 19 hours of peak load operation. For the emissions of SO_2, PM10 and VOC emissions (from the LM6000 only), the REP turbine/HRSG trains are operating at peak load for 24 hours each. The auxiliary boiler is assumed to be at full potential output and the cooling tower is assumed to be at full operational load. The emergency generator and firewater pump are assumed to both be test-fired (30-minute duration each, not during startup).

Maximum Quarterly and Annual Emissions

The maximum quarterly and annual emissions, excluding NOx, are based on the operational schedule provided in **AIR QUALITY Table 6a**.

In AIR QUALITY Tables 7b and **7c**, staff shows the expected Quarterly and Annual NOx emissions based on the LM6000 turbine and the operational profiles of **AIR QUALITY Tables 6b** and **6c**, respectively. The emission limits proposed for the REP are based on these emission estimates and will be enforced both for the LM6000 and GTX100 options.

AIR QUALITY Table 7b
Maximum Expected Quarterly and Annual Operational NOx Emissions
Based on the Operational Profile of AIR QUALITY Table 6b

Quarterly Emissions (lbs/quarter)				Annual (tons/year)
Quarter 1	Quarter 2	Quarter 3	Quarter 4	
15,546	13,412	17,646	15,572	31.09

AIR QUALITY Table 7c
Maximum Expected Quarterly and Annual Operational NOx Emissions
Based on the Operational Profile of AIR QUALITY Table 6c

Quarterly Emissions (lbs/quarter)				Annual (tons/year)
Quarter 1	Quarter 2	Quarter 3	Quarter 4	
11,337	7,429	15,646	12,378	23.39

Ammonia Emissions

RE proposes to control NOx emissions to 2.0 ppmv @ 15 percent O_2 averaged over one-hour through either the use of Dry Low-NOx combustors (GTX100) or water injected combustors (LM6000) and SCR. Significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. However, not all of this ammonia mixes in the flue gases within the catalyst of the SCR to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered, out the stacks. These ammonia emissions are known as ammonia slip. RE has committed to an ammonia slip no greater than 10 ppm @ 15 percent O_2. On a daily basis, the ammonia slip of 10 ppm is equivalent to approximately 220.8 lbs/day (LM6000), or 228.0 lbs/day (GTX100) of ammonia emitted into the atmosphere per turbine. It should be noted that an ammonia slip of 10 ppm is usually associated with the significant degradation of the SCR catalyst. This degradation typically begins two years or more after initial operation. Prior to the ammonia slip exceeding 10 ppm, the SCR catalysts are removed and reconditioned or replaced with new catalysts. Through most of the operation of the SCR system, ammonia slip emissions are usually in the range of 1 to 2 ppm, corresponding to a mass emissions of approximately 22 to 46 pounds per day per turbine.

Initial Commissioning

The initial commissioning of a power plant refers to the time frame between completion of construction and the consistent production of electricity for sale on the market. Normal operating emission limits usually do not apply during initial commissioning procedures. REP will go through several tests during initial commissioning. During the first set of tests, post-combustion controls will not be operational (i.e., the SCR and oxidation catalyst).

These tests start with a Full Speed-No Load test. This test runs the turbine at approximately 20 percent of its maximum heat input rate. Components tested include the ignition system, synchronization with the electric generator and the turbine-overspeed safety system. Part Load testing runs the turbines to approximately 60 percent of the maximum heat input rating. During this test the turbine and HRSG will be tuned and the HRSG steam lines will be checked. Full Load testing runs the turbines to their maximum heat input rate. This testing entails further tuning of the turbine and HRSG as well as the steam lines. Full Load –Partial SCR testing runs the turbines at 100 percent of their maximum heat input rate and operates the SCR ammonia injection grid for the first time. Finally, Full Load – Full SCR testing runs the turbines at their maximum heat input rate and operates the SCR ammonia inject grid at its full capacity. It is during this test that the SCR system will be completely tuned and operating at design levels (i.e., NOx control at 2.0 ppm).

Experience from recent licensing cases suggests that initial commissioning for a combined cycle system of this size last approximately 30 days. Additionally, daily operation of the turbines during the commissioning period is typically limited to several hours a day. RE has stated that the turbines would be operated, on average, not more than six hours in a single day during the initial commissioning period. RE has estimated that the approximate maximum emissions during commissioning (turbine operation without SCR or oxidation catalyst controls) for the LM6000 will be 28.9 lbs/hr NOx and 24 lbs/hr CO, and for the GTX100, 40 lbs/hr NOx and 1,000 lbs/hr CO. Staff finds these estimates to be reasonable, with the exception of the GXT100 CO emissions, which seem excessively high.

Facility Closure

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

The Permit to Operate, issued by the District, is required for operation of the facility and is usually renewed on a regular schedule. If RE chooses to close the REP facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the facility could not restart and operate unless RE pays the fees to renew the Permit to Operate.

If RE were to decide to dismantle the project, there would likely be fugitive dust emissions associated with this dismantling effort. The Facility Closure Plan to be submitted to the Energy Commission Compliance Project Manager should include the specific details regarding how RE plans to demonstrate compliance with the District Rules regarding fugitive dust emission limitations.

EMISSION IMPACTS ON AIR QUALITY

RE performed an air dispersion modeling analysis to evaluate the project's potential impacts on the existing ambient air pollutant levels, during both construction and operation. An air dispersion modeling analysis usually starts with a conservative screening level analysis. Screening models use very conservative assumptions, such as the meteorological conditions, which may or may not actually occur in the area. The impacts calculated by screening models, therefore, can be double or more than the actual or expected impacts. If the screening level impacts are significant, refined modeling analysis is performed. A major difference in the refined modeling is that hour by-hour meteorological data collected in the vicinity of the project site is used. The Industrial Source Complex Short-Term model, Version 3, known as the ISCST3 model, was used for the refined modeling.

CONSTRUCTION

The results of the ISCST3 modeling analysis (see **AIR QUALITY Table 8**) showed that only construction PM10 emission impacts (24-hour and annual) are expected to contribute to an existing violation of the state PM10 (24-hour and annual) ambient air quality standards. From the modeling results file, the location of the PM10 impacts

(both 24-hour and annual) would be approximately 740 feet southwest from the area under construction, which is in an area that is currently uninhabited. The closest residence is approximately 1,200 feet north of the project site, where the modeling predicts the PM10 impacts from construction would not occur. However, City employees work at the Pleasant Grove Waste Water Treatment Plant (PGWWTP), located directly adjacent to the REP proposed construction site. The distance and direction of the maximum predicted construction PM10 emission air quality impacts suggest that these impacts may fall within the facility boundary of PGWWTP. Thus, it is reasonable to provide mitigation to the extent feasible for the protection of these employees.

AIR QUALITY Table 8
Maximum Predicted Construction Emission Air Quality Impacts

Pollutant	Averaging Time	Direct Impacts (ug/m^3)	Background (ug/m^3)	Total Impact (ug/m^3)	Limiting Standard (ug/m^3)	Total Impact as a Percent of Standard
NO2	1-hour	242.9	182.4	425.3	470	90%
	Annual	7.623	30.2	37.8	100	38%
CO	1-hour	769.2	5,257	6,026	23,000	26%
	8-hour	419.7	3,122	3,542	10,000	35%
SO_2	1-hour	161.4	49.8	211.2	655	32%
	24-hour	34.2	28.7	62.9	105	60%
	Annual	0.091	0.05	0.141	80	0%
PM10	**24-hour**	66.1	62.0	128.1	50	**256%**
	Annual	5.68	25.2	30.9	20	**154%**

Notes:
NO2 1-hour predicted impacts assume ozone limiting based on available ozone data between the expected construction activity hours of 8am and 4pm.
NO2 annual predicted impacts assume an ARM ratio of 75%.
Background concentrations are from **AIR QUALITY Table 3**.

Source: (Roseville 2003a)

OPERATION

The air quality impacts of project operation are shown in the following sections for fumigation meteorological conditions, and during the facility start-up and steady-state operations.

Fumigation

During the early morning hours before sunrise, the air is usually very stable. During such stable meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed. When the sun first rises, the air at ground level is heated, resulting in a vertical (both rising and sinking air) mixing of air for a few hundred feet or so. Emissions from a stack that enter this vertically mixed layer of air will also be vertically mixed, bringing some of those emissions down to ground level. Later in the day, as the sun continues to heat the ground, this vertical mixing layer becomes higher and higher, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 90 minutes.

RE used the SCREEN3 model, which is a U.S. EPA approved model, for the calculation of fumigation impacts. **AIR QUALITY Table 9** shows the modeled fumigation results and impacts on the one-hour NO_2, CO and SO_2 standards. Since fumigation impacts will not typically occur much beyond a one-hour period, only impacts on these one -hour standards were addressed. The results of the modeling analysis show that fumigation impacts will not violate the NO2, CO or SO_2 one -hour standards.

AIR QUALITY Table 9
Estimated Facility Fumigation One-hour Air Quality Impacts

Pollutant	Direct Impact (ug/m^3)		Background (ug/m^3)	Total Impact (ug/m^3)		Limiting Standard (ug/m^3)	Total Impact as a Percent of Standard	
	LM6000	GTX100		LM6000	GTX100		LM6000	GTX100
NO_2	24.3	25.0	182.4	206.7	207.4	470	44%	44%
CO	16.5	17.1	5,257	5,274	5,274	23,000	23%	23%
SO_2	1.40	1.45	49.8	51.2	51.3	655	8%	8%
Notes Background concentrations are taken from **AIR QUALITY Table 3**.								

Source: (Roseville 2003a)

OPERATIONAL MODELING ANALYSIS

Until it is able to secure the offsets necessary for full operation, RE is proposing to lower the operational emissions of the REP project, which would also lower the corresponding air quality impacts. Therefore, the existing modeling assessment is presented below with the understanding that it is clearly over predicting the REP project emission air quality impacts. RE provided staff with a modeling analysis, using the ISCST3 model to quantify the potential impacts of the project for both turbines, during normal steady state operation and during start-up conditions. This modeling analysis consisted of a screening level and a refined level analysis. The screening level analysis tested basic operating conditions, which combined various load levels and duct burner operations with several ambient air temperatures. The refined modeling was developed from these screening level runs. The refined modeling impacts are shown in **AIR QUALITY Table 10**. The REP PM10 impacts could contribute to existing violations of the state 24-hour and annual average PM10 standards.

Maximum Expected Impacts

The modeling assessment showed that the maximum one-hour air quality emission impacts from the facility would occur when the facility is at peak load and the auxiliary boiler is in operation. This is due to the fact that the auxiliary boiler, while fairly clean (burning natural gas), has a much lower stack than the combustion turbines. This lower stack generally results in less dispersion and thus higher emission impacts. Staff has included three other operating scenarios in **AIR QUALITY Table 10** because the maximum expected NO_2 emission impacts are very close to contributing to a new violation of the one-hour NO_2 ambient AAQS. The modeling results are high because the applicant has not used the ozone-limiting method (OLM) to refine the modeling results. Without using OLM, RE is assuming that all of the NOx (NO and NO_2) emitted from the stack is converted into NO_2. What actually occurs is that about 10 percent of the NOx emitted is emitted as NO_2; the rest is NO. The NO emissions are converted to NO_2 by ambient ozone. OLM takes this fact into consideration and estimates the final

NO_2 concentrations from the modeled NOx concentrations and the recorded ambient ozone concentrations. Thus, if RE chooses to use OLM, the final modeling results would be 10 percent to 20 percent of that currently shown in **AIR QUALITY Table 10**. Given the modeling results shown in **AIR QUALITY Table 10**, staff concludes that only the PM10 emissions are reasonably likely to contribute directly to an existing violation of the state PM10 (24-hour and annual) ambient air quality standards if left unmitigated, and that this impact is significant. For the other pollutants (NO_2, CO and SO_2), the project's emission impacts do not cause a new violation of the ambient standards, and thus, are not a significant impact.

AIR QUALITY Table 10
Maximum Predicted Operational Emission Air Quality Impacts

Pollutants	Averaging Time	Direct Impacts (ug/m^3)		Background (ug/m^3)	Total Impacts (ug/m^3)		Limiting Standard (ug/m^3)	Total Impact as a Percentage of Standard	
		LM6000	GTX100		LM6000	GTX100		LM6000	GTX100
NO_2	1-hour Peak Load with boiler	275.8	275.8	182.4	458.2	458.2	470	**97%**	**97%**
	1-hour Startup	117.0	129.8	182.4	299.4	312.2	470	64%	66%
	1-hour Peak Load	15.8	16.2	182.4	198.2	198.6	470	42%	42%
	1-hour Base load	7.77	10.23	182.4	190.2	192.6	470	40%	41%
	Annual	1.33	1.34	30.2	31.5	31.5	100	32%	32%
CO	1-hour	377.1	377.1	5,257	5,634	5,634	23,000	24%	24%
	8-hour	126.0	134.1	3,122	3,248	3,256	10,000	32%	33%
SO_2	1-hour	49.9	49.9	49.8	69.7	69.7	655	11%	11%
	24-hour	2.33	2.33	28.7	31.0	31.0	365	9%	9%
	Annual	0.07	0.07	0.05	0.12	0.12	80	0%	0%
PM10	24-hour	16.7	16.7	62.0	78.7	78.7	50	**157%**	**157%**
	Annual	0.46	0.46	25.2	25.7	25.7	20	**128%**	**128%**

Notes:
Background concentrations are from **AIR QUALITY Table 3**.
NO_2 impacts assumption:
All 1-hour NO_2 impacts assume no ozone limiting method.
Both turbines in peak load operation and the auxiliary boiler on.
Both turbines in startup operation and the auxiliary boiler on.
Both turbines in peak load operation and the auxiliary boiler off.
Both turbines in base load operation and the auxiliary boiler off.

Source: (Roseville 2003a)

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of the secondary pollutants ozone and PM10/PM2.5. There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the modeling to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, the emissions of NOx and VOC from the REP do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

Secondary PM10 formation, which is actually PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, then reacted with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out, however the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest: ammonia rich and ammonia poor. In the case of ammonia rich, there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. In the case of an ammonia-limited environment, additional ammonia will tend to increase PM2.5 concentrations.

Based on the estimates made by staff of the possible ammonia inventory of the District, staff assumes that the immediate environment for the REP facility is ammonia limited. Thus, the ammonia emissions from the REP stacks may increase ambient air PM2.5 concentrations through the formation of ammonium sulfates and nitrates. There is insufficient information to determine how much this increase may be. However, the District is classified non-attainment for the state PM10 and PM2.5 ambient air quality standards. Thus, staff concludes that there is a reasonable likelihood that the ammonia emissions from the REP facility would contribute to existing violations of the PM10 or PM2.5 state ambient air quality standards.

Visibility Impacts

A visibility analysis of a project's gaseous emissions is required under the Federal Prevention of Significant Deterioration (PSD) permitting program; however, the REP does not trigger PSD review. The analysis would address the contributions of gaseous emissions (primarily NOx) and particulate (PM10) emissions to visibility impairment on the nearest Class 1 PSD areas, which are national parks and national wildlife refuges. There are no Class 1 PSD areas in the vicinity of the REP.

Greenhouse Gas Emissions Reporting

In addition to regulated criteria pollutants, the combustion of natural gas produces air emissions known as greenhouse gases. These include primarily carbon dioxide and methane (unburned natural gas). Greenhouse gases are known to contribute to the warming of the earth's atmosphere. Climate change from rising temperatures represents a risk to California's economy, public health, and environment due to changes in sea levels that could lead to flooding of coastal communities, drought, forest fires, decline of fish populations, reduced hydropower opportunities, and loss of habitat. In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state should require reporting of greenhouse gas emissions as a condition of state licensing of new electric generating facilities (CEC 2003, p. 42). Staff recommends Condition of Certification **AQ-SC7** that

requires the project owner to report the quantities of each greenhouse gas emitted as a result of facility operation. Such reporting would be done in accordance with accepted reporting protocol as specified.

Cumulative Impacts

Cumulative impacts refer to two or more individual impacts when, considered together, are considerable or increase other environmental impacts. A cumulative impact analysis must identify past, present, and reasonably foreseeable projects, estimate the impact of these projects and recommend mitigation measures for those impacts found to be significant.

The Commission has developed a procedure for addressing cumulative impacts on air quality from power plant projects. Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see Operational Modeling Analysis section) the project contributions to cumulative impacts can be estimated. To represent "past" and, to an extent, "present projects" that contribute to ambient air quality conditions, the Commission staff recommends the use of ambient air quality monitoring data (see Environmental Setting section), referred to as the "background". The Commission has the following procedures to estimate what are additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new application for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Beyond six miles, staff has determined through experience, there is very little chance for air emissions to interact directly. This effectively identifies all new emissions that emanate from a single point (e.g., a smoke stack), referred to as point sources. The Commission uses the submittal of an air district application as a reasonable demarcation of what is "reasonably foreseeable". So, as an example, if the last year of ambient air quality monitoring data from area monitoring stations was 2003, then Commission staff (or the applicant) would ask the air district for all new applications that are not included in the ambient data.
- Second, the Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIR) that are prepared for those sources. The Commission uses the initiation of the EIR process as the demarcation of "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources provides enough information to render these new emission sources in air dispersion modeling. Thus the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled. All sources are not modeled, for example a source that is emitting only VOC emissions will not be

modeled (this actually occurred in one case, the source was physically modified to reduce NOx, but also increased VOC).

- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than two miles away.
- When there are multiple sources, and we are primarily interested in the contributions of the project emissions with these other sources to these impacts, the modeling results are carefully interpreted so that they are not skewed towards smaller, high-impacting sources.

Once the modeling results are interpreted, they are added to the background; thus, the modeling portion of the cumulative assessment is complete. Since this portion of the cumulative analysis is dependent on air dispersion modeling programs, the Commission staff requires that the applicant submit a modeling protocol prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented upon, and eventually approved in the Data Adequacy phase of the licensing procedure. It has been Commission policy to aid the applicant in finding sources (as described above), characterizing those sources and interpreting the results of the modeling. However, the actual modeling runs are traditionally left to the applicant to complete. There are several reasons for this; modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the project alone (see Operational Modeling Analysis section), and the applicant can act on its own to modify the project as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the project emissions can be evaluated, and the mitigation itself can be proposed or required (see Mitigation section).

The cumulative analysis for REP includes as reasonably foreseeable, the following sources:

West Roseville Specific Plan buildout

This source was modeled as an area source with 1,151.2 lbs/day of NOx emissions, 25,187.8 lbs/day of CO emissions and 4,150.6 lbs/day of PM10 emissions. These emission rates include both mobile and stationary sources and are assumed to occur 365 days per year. The emissions themselves are clearly over estimated, the assuming that they are constant throughout the year.

Pacific MDF – 1.25 MW wood waste boiler

This is a new source that was identified by the District. It was modeled as a point source, with the assumption that it is to be operated throughout the year with the following emission rates: 0.89 lbs/hr of NOx, 1.66 lbs/hr of CO, 0.80 lbs/hr of PM10 and 0.69 lbs/hr of SO2.

Energy 2001 – Two landfill gas engines

This is an existing source which would normally assumed to be represented in the background ambient air quality monitoring, but has been identified here due to its lack of operating history. It was modeled as a point source operating throughout the year with the following emission rates: 3.5 lbs/hr of NOx, 14.4 lbs/hr of CO, 2.9 lbs/hr of PM10 and 2.3 lbs/hr of SO_2.

AIR QUALITY Table 10.5 shows the results of the modeling assessment done by RE. These results predict that the combined emissions of these sources with the ambient background measurements will cause new violations of the California State 1-hour NO_2 ambient air quality standard, the 24-hour SO_2 standard, 1-hour CO standard, and the annual PM10 standard. If this were in fact the case, this would be cause for significant concern. However, staff is confident that these results are grossly overconservative (see discussion below) and that these sources will not cause new violations of the ambient air quality standards with the exception of short-term (24 hours or less) PM10/PM2.5 and ozone standards that are currently being violated.

The modeling result files (not shown here) indicate that the majority of the cumulative impact is from the Western Roseville Specific Buildout Plan (WRSBP). The emission rates assumed for this source are very conservative and include both stationary and mobile sources, assuming that they will emit evenly throughout the entire year. The WRSBP is also modeled as an area source, meaning the emission plume will have very little rise and thus, very little dispersion. So, with conservative emission rates and little dispersion, the emission impacts from ISC (the model used) will be high. However, based on experience, staff is certain that these ISC predictions will not occur. The ISC model predicts that there will be new violations of the NO_2, SO_2 and CO federal and state ambient air quality standards. Only in densely populated areas such as the City of Los Angels, do we see periodic violations of the state CO ambient air quality standards. Nowhere in California do we see even periodic violations of the NO_2 or SO_2 federal or state ambient air quality standards. Therefore, staff finds that the results of the cumulative modeling submitted are excessively conservative, and staff does not expect there to be significant cumulative impacts to the ambient air quality from the WRSBP.

While the modeling results of the cumulative assessment shown in AIR QUALITY Table 10.5 are excessively conservative, they do not change staff's opinion regarding the REP emission impacts on the ambient air quality. Thus, staff concludes that the REP NOx, PM10, VOC and SOx emission impacts on the ambient air quality are significant if left unmitigated.

AIR QUALITY Table 10.5
Results of Cumulative Assessment

Pollutant	Averaging Time	Maximum Multisource Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Ambient Concentration ($\mu g/m^3$)	REP Contribution ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	1,818.76	161.8	1980.56	275.77	470	-
	Annual	447.32	32.0	479.30	0.99	-	100
SO_2	1-hour	73.40	49.8	123.2	49.88	650	-
	3-hour	378.70	31.4	410.1	9.30	-	1300
	24-hour	99.19	28.8	127.99	2.33	109	365
	Annual	13.11	5.2	18.31	0.733	-	80
CO	1-hour	39,769.1	5269.8	45,038.9	377.12	23,000	40,000
	8-hour	5,846.4	3551.4	9,937.8	134.13	10,000	10,000
PM_{10}	24-hour	15.57	93.0	108.57	16.68	50	150
	Ann.Geo.	462.78	25.0	487.78	0.484	30	-
	Ann.Arith.	462.78	25.0	487.78	0.484	-	50

MITIGATION

APPLICANT'S PROPOSED MITIGATION

Construction

RE has proposed the following mitigation measures to control emissions during the construction phase of the proposed REP.
Fugitive Dust Control:

- Watering or chemical dust suppressant application on unpaved roads, wind erosion areas (disturbed by construction) or storage piles.
- Vacuum sweeping or water flushing of paved road surfaces to remove track-out.
- Covering or require two feet of freeboard for all trucks hauling soil, sand or other loose material.
- Using sandbags or other erosion control measures, to control run-off.
- Replanting vegetation as quickly as possible.
- Using wheel washing for all trucks leaving the construction site.

Construction Equipment Controls:

- Limiting engine idle time by shutting down when not in use.
- Performing regular preventive maintenance.
- Using low sulfur or low aromatic fuel meeting California standard for motor vehicle diesel fuel.

- Using low emitting gas and diesel engines meeting state and federal emission standards for construction equipment, including but not limited to catalytic converter systems and particulate filter systems.

Operation

The REP air pollutant emissions impacts will be reduced by using emission control equipment on the project and by providing emission offsets. To reduce NOx emissions, RE proposes to use dry-low NOx or water injection into the combustors in the CTGs and an SCR system with an ammonia injection grid.

To reduce CO emissions, RE proposes to use a combination of good combustion and maintenance practices, along with an oxidizing catalyst located in the HRSG. The use of a clean-burning fuel (natural gas) and the efficient combustion process of the CTGs will limit VOC and PM10 emissions. The use of natural gas as the only fuel will limit SO_2 emissions.

Combustion Turbine

Water Injection

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NOx formed during combustion. One method has been steam or water injected into the combustor cans to reduce combustion temperatures and the formation of thermal NOx, which is the primary source of NOx emissions from a CTG. This method has been employed for many years and is well understood. RE has proposed this pre-combustion control for the GE LM6000 CTGs.

Dry Low-NOx Combustors

Because of the expense and efficiency losses that result from steam or water injection, some CTG manufacturers are presently choosing to limit NOx formation through the use of dry low-NOx technologies. The Alstom version of the dry low-NOx combustor is a two stage ignition system. Initially the fuel/air mixture is ignited in two independent combustors and enters a premix stage (zero to 60 percent load). The low emissions are achieved from approximately 60 percent load on with the ignition of the center burner.

Flue Gas Controls

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed in the HRSGs. RE is proposing two catalyst systems, an SCR system to reduce NOx, and an oxidizing system to reduce CO.

Selective Catalytic Reduction (SCR)

SCR refers to a process that chemically reduces NOx by injecting ammonia into the flue gas stream over a catalyst in the presence of oxygen.

The process is termed selective because the ammonia reducing agent preferentially reacts with NOx rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures,

which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950° to 1100° F.

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

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

Oxidizing Catalyst

To reduce the turbine CO emissions, RE proposes to install an oxidizing catalyst, which is similar in concept to catalytic converters used in automobiles. The catalyst is usually coated with a noble metal, such as platinum, which will oxidize unburned hydrocarbons and CO to water vapor and carbon dioxide (CO_2). The CO catalyst is proposed to limit the CO concentrations exiting the HRSG stack to 4 ppm, corrected to 15 percent excess oxygen and averaged over three-hours.

Emission Offsets

To comply with the District Rule 502 and to offset the increased emissions from the REP, RE is proposing to surrender the following emission reduction credits (ERCs). These ERCs are summarized in **AIR QUALITY Table 11** with their values adjusted as indicated below.

District Certificate 2001-22 (reissued as 2004-05)

This certificate constitutes 28.4 tons of PM10 emission reduction from the shut down of an aggregate handling facility in 1996 located at 1800 Sunset Blvd, Rocklin (approximately seven miles from the REP site). The ERC value was calculated based on the U.S. EPA AP-42 (4th Edition) emission factors for all considered equipment and throughputs. The ERC is dominated by the control of fugitive dust emissions, for which the available water controls were being considered 90 percent effective. The consideration of reasonably available control technology (RACT) or best available retrofit control technology (BARCT) adjustments where not made at the time that the ERC was issued. The District has applied a distance-offset ratio of 1.3 per Rule 502.

District Certificate 2001-23 (reissued as 2004-03)

This certificate constitutes 10.1 tons of NOx emission reduction from the 1993 shutdown of two wood-fired boilers at the Georgia Pacific lumber mill at 23901 Foresthill Road, Foresthill (approximately 25 miles from the REP site). The ERC value was calculated

from source testing and averaged over two years of operation. The emissions were RACT/BARCT adjusted at the time of issuance, meaning that the emissions were reduced from their actual amounts to what they would have been if the recommended RACT/BARCT technology were applied. The District has applied a distance-offset ratio of 2.0 per Rule 502.

District Certificate 2001-24 (split and reissued to 2004-04 and 2004-06)

This certificate constitutes 29.4 tons of PM10 emission reduction from the same shutdown as Certificate 2001-23 above. The PM10 emissions were calculated from source testing on the wood-fired boilers (see above) which were controlled by centrifugal cyclone and by using AP-42 emission factors for the sawmill. The cyclone was considered RACT/BARCT at the time of issuance for the boilers and no further RACT/BARCT adjustment was made to the sawmill emissions. The District has applied a distance-offset ratio of 2.0 per Rule 502.

District Certificate 2001-26 (reissued as 2004-05)

This certificate constitutes 67.0 tons of VOC emission reductions from the same shutdown as Certificate 2001-23 above (wood-fired boilers only). RE is proposing to trade these VOC ERCs for a portion of the REP NOx emissions. The District has determined that a trading ratio of 2.6 (lbs VOC) to 1.0 (lbs NO2) is reasonable and consistent with other recent interpollutant trading ratios proposed. The most pertinent of the 10 projects considered is the Cosumnes Power Plant Project which resulted in the same trading ratio. The District has also applied a distance-offset ratio of 2.0 per Rule 502.

YSCAQMD Certificate EC-209 (re-issued as EC-238)

This Yolo-Solano County Air Quality Management District (YSCAQMD) certificate constitutes 5.22 tons of NOx emission reductions from a 1993 shutdown of the Spreckles Sugar Company's beat pulp processing facility (also know as the Delta Sugar Plant) located at the corner of River Rd and Willowpoint Rd, Clarksburg CA (approximately 35 miles from the REP site). Emissions were based on AP-42 emission factors for natural gas/wood waste fired dehydrator operations. BARCT adjustments were made to the original certificate in 1999 when the ERC was transferred and used by the Calpine Corp. The certificate was re-issued (to separate VOC and NO_2 ERCs) and has been transferred to the PCAPCD with a holdback of 10 percent to be offered for sale in Yolo-Solano. The PCAPCD has applied a distance-offset ratio of 2.1 per Rule 502.

YSCAQMD Certificate EC-210 (re-issued as EC-238)

This YSCAQMD certificate constitutes 7.52 tons of NOx emission reductions from the Spreckles Sugar Company's facility described above. Emissions were based on AP-42 emission factors for coke-fired lime kiln operations; RACT/BARCT adjustments were not applied. The certificate was transferred to the PCAPCD with a holdback of 10 percent to be offered for sale in Yolo-Solano. The PCAPCD has applied a distance-offset ratio of 2.1 per Rule 502.

Energy 2001 – Landfill Gas-to-Energy Facility

RE has proposed to reduce the NO_2 emissions at the ENERGY 2001 Landfill Gas-to-Energy facility, which is located approximately four miles from the REP project site, in Lincoln. The REP proposal is to reduce the NO_2 emissions by 10 tons per year, then subsequently create, and surrender NO2 ERCs prior to the first fire of the REP facility. The PCAPCD has applied a distance-offset ratio of 1.3:1.

The Energy 2001 facility consists of two Caterpillar engines (model G3615) attached to two generators rated at 800 kw each. These engines were only recently installed as replacements, but are currently operational. The Energy 2001 facility has had a permit to operate since 1999. REP proposes to install ammonia injected SCR at the Energy 2001 facility to reduce NOx emissions there by 90 percent. Such an SCR system would require further controls on the fuel (landfill gas) to remove H_2S and other impurities so as not to contaminate the catalyst. Energy 2001 estimates that there is a potential for up to 11.5 tons per year of NO_2 reductions if this retrofit control system is compatible for use with landfill gas. The actual emission reductions will be based on emission source testing of the facility exhausts and a consistent record of operation.

SMAQMD Community Bank

In the event that the NOx emission reductions at the Energy 2001 facility do not materialize, RE has proposed to purchase the required NO_2 ERCs from the Sacramento Metropolitan Air Quality Management District (SMAQMD) Community Bank.

The SMAQMD Solutions for the Environment and Economic Development (SEED) program provides funding for innovative emission reduction programs. The source of these funds is the revenue generated from limited term loans of ERCs from the SMAQMD Community and Priority Reserve Bank which result from SEED-funded programs that are deposited in the Community Bank. Thus, funds from RE purchases of ERCs from the Community Bank will result in funding of emissions reduction programs in the SMAQMD area.

A request for a permanent loan from the Community Bank must be brought before the SMAQMD Board for approval. SMAQMD Staff presents the qualifying applications to the Board at the meeting just prior to the beginning of the quarter for which the loans are requested. The Board considers the extent to which cleaner innovative technologies have been used to minimize credit needs and may conditionally grant loans to protect the health of the bank or to promote cleaner, innovative technology. The Board may deny any application if it determines that the denial is in the best interest of the Sacramento Federal Ozone Non-attainment Area.

After the SMAQMD Board approval of an application for Community Bank NO2 ERCs, the PCAPCD and the SMAQMD Boards must both approve the transfer of these ERCs from Sacramento Metro to Placer County. The PCAPCD will apply a distance-offset ratio of 2.1:1.

If REP were to submit an application for a permanent loan from the SMAQMD Community Bank for the entire NO_2 ERC requirement, they would need to request

approximately 16.15 tons per year with a possible maximum of 8,562 lbs in the first and second quarters.

AIR QUALITY Table 11
Summary of Adjusted Emission Reduction Credits

Certificate	1st Quarter (lbs)	2nd Quarter (lbs)	3rd Quarter (lbs)	4th Quarter (lbs)	Annual (Tons)
NOx					
2001-23 (2004-03)	2,525	2,525	2,525	2,525	5.1
2001-26 (2004-05) VOC for NOx	6,445	6,445	6,445	6,445	12.9
EC-209 (EC-238)	0	2,952	0	1,518	2.2
EC-210	0	4,551	0	1,892	3.2
Energy 2001 and/or SMAQMD Community Bank	4,077	4,077	4,038	3,192	7.7
Total Adjusted NOx ERCs	**13,047**	**20,550**	**13,008**	**15,571**	**31.1**
PM10					
2001-24 (2004-04)	11,340	0	6,720	11,340	14.7
2001-24 (2004-06)	181	0	210	0	0.196
2001-22 (2004-02)	1,983	15,246	12,373	12,243	20.93
Total Adjusted PM10 ERCs	**13,504**	**15,513**	**19,303**	**23,583**	**35.95**

Source: (PCAPCD 2004a)

ADEQUACY OF PROPOSED MITIGATION

Construction

Staff finds that the mitigation proposed for fugitive dust control is reasonable and will mitigate the impacts from fugitive dust to the extent feasible. However, staff finds that there are further mitigation measures possible for the control of combustion emissions from construction equipment. These additional mitigation measures are discussed in the Staff Proposed Mitigation section below.

Operation

NOx Emission Reduction Credits

Staff agrees with the findings by the District that the proposed emission control measures represent BACT and that the REP facility is thus capable of operating under their proposed emission limits. Staff finds that the ERCs proposed to offset the REP project emission air quality impacts are valid under the District New Source Review program and do mitigate those impacts to the extent indicated in **AIR QUALITY Table 11**. However, staff has reservations regarding the future NO_2 ERCs to be either developed at the Energy 2001 facility or purchased from the SMAQMD Community Bank. Staff will make their recommendations regarding these NO_2 ERCs sources in the Staff Proposed Mitigation section below.

Energy 2001

To staff's knowledge, the technology required to install and operate an ammonia injected SCR for a landfill gas-to-energy facility has not been tested in California. However, all the technology needed to perform this task is available from multiple venders. Ammonia-injected SCR systems have been successfully installed on natural gas fired internal combustion (IC) engines and are considered BACT in the South Coast Air Quality Management District. However, high levels of H_2S (above five ppm) in the fuel can contaminate these SCR systems. Recent measurements of the landfill gas at Energy 2001 shows approximately 25-30 ppm H_2S content. Therefore, in addition to the gas treatment already being performed at the facility (primarily removing siloxanes and water) to protect the engines, it will likely be necessary to remove the H_2S and other impurities from the gas stream to protect the SCR system. There are several examples of landfill gas clean up projects that use fuel cells as the prime mover (as opposed to IC engines) where clean up of the fuel stream to this degree was necessary and successful. However, these efforts might not be duplicated at Energy 2001.

There are four major benefits from the successful installation of an SCR system at the Energy 2001 facility. The Energy 2001 facility emission reductions would be contemporaneous with the REP emission increases, i.e., meaning the emissions reductions would occur just prior to the emission increases. The Lincoln Western Regional Landfill, where Energy 2001 is located, is open and receiving waste. Energy 2001 expects that in the future there could be several new engines installed to run on the landfill gas that would be generated. These new engines could also have SCR installed. The successful installation and operation of the SCR system at Energy 2001 could be used to establish a new BACT level for landfill gas-to-energy facilities. Lastly, there are approximately 75 landfill gas-to-energy facilities in California, so the successful installation and operation of the SCR system at Energy 2001 could provide a model for the creation of future ERCs at these power plants.

Although staff believes that the Energy 2001 SCR project is a laudable source of mitigation that should be pursued, it is somewhat speculative. Therefore, staff recommends that the REP limit its operation until the proposed NOx emissions reductions are achieved.

SMAQMD Community Bank

There are significant time constraints regarding the filing of an application with the SMAQMD for NO_2 ERCs from the Community Bank. The application must be made well in advance of the calendar quarter in which the ERCs are needed. This gives the SMAQMD staff the necessary time to evaluate the licensing procedure for REP including the BACT findings, mitigation and control strategies. SMAQMD staff presents the application with their analysis to the Board at the meeting just prior to the beginning of the quarter for which the ERCs are requested. The Board must find that clean technologies have been used at REP and must explicitly protect the integrity of the bank. The Board may deny the application if the Board determines that it is in the best interest of the Sacramento Federal Ozone Non-attainment Area.

To procure the full equivalent of the NO_2 ERCs proposed to be developed from the Energy 2001 facility retro-fit project, RE would need approximately 16.2 tons of NO_2 ERCs from the SMAQMD Community Bank. This amount would be difficult for the SMAQMD Board to approve while still making their necessary findings, so, staff considers the SMAQMD Community Bank NO_2 ERCs to be a speculative source of offsets.

PM10 Emission Reduction Credits

The REP is deficient in PM10 ERCs in the first quarter, but there are more than enough excess PM10 ERCs in the second quarter that can be credited to the first quarter (via District Rules) to satisfy the offset requirements for PM10. However, the PM10 ERCs being proposed may have a considerable portion of the emission reductions contributed from dust sources (PM10), rather than combustion sources (PM2.5). The PM10 emissions that are to be emitted from REP are primarily from combustion sources (PM2.5). Until a PM2.5 State Implementation Plan is developed by the District and ratified by the U.S. EPA, however, staff concludes that the proposed mitigation is reasonable and that the proposed PM10 ERCs fully mitigate the REP PM10/PM2.5 emission impacts.

CO, VOC & SOx Emission Reductions

The REP does not trigger the District Rule 502 offset requirements for VOC, SOx or CO emissions. Staff notes that the District disagrees with the U.S. EPA comment that the CO BACT determination should be two ppm rather than four ppm. The U.S. EPA commented on the District's CO BACT finding for REP based on an Energy Commission power plant project (Malburg Station) that has proposed a CO emission limit of two ppm, but has not demonstrated this limit in practice since they are not yet operational. The District therefore determined that their rules and regulations allowed the higher CO limit to qualify as BACT given Malburg's lack of operational experience.

While the REP VOC emissions will not cause a direct impact to the ambient air quality, they can in combination with NOx emissions, contribute to downwind ozone formation if left unmitigated. Staff's responsibility in evaluating a project under CEQA is that the project cannot degrade the environment but it does not necessarily have to improve the environment. Staff has traditionally interpreted this to mean that the offset ratios

imposed by the District NSR rules, which are designed to improve the ambient air quality, are not necessary for CEQA evaluations.

As shown in **AIR QUALITY Table 12** below, the REP NOx emission liability from **AIR QUALITY Table 7** is 23.4 tons/year. RE has proposed to surrender 21.57 tons of NO_2 ERCs in compliance with the District NSR requirements. This leaves a remaining REP NOx emission liability of 1.83 tons/year. For compliance with District NSR rules, RE has also proposed to trade 67.02 tons/year of VOC ERCs for NO_2 ERCs at an interpollutant-trading ratio of 2.6:1 (that is, 2.6 lbs of VOC for 1 lb of NO_2). This interpollutant-trading ratio has been reviewed and accepted by the District, U.S. EPA and CARB, as well as the Commission staff. As shown in the CEQA assessment in **AIR QUALITY Table 12**, with this interpollutant-trading ratio RE would need approximately 4.76 tons of VOC ERCs to mitigate the REP NOx emissions to zero (1.83 tons/year of NOx times 2.6 VOC/NO2 equals 4.76 tons/year of VOC). Thus the VOC ERCs reduce the REP NOx emission CEQA liability to zero with approximately 62.24 tons/year of VOC ERCs remaining. The highest VOC emission liability for REP between both the LM6000 turbine option and the GTX100 turbine option is 13.42 tons/year (see **AIR QUALTY Table 7a**). Thus, there is far sufficient VOC ERCs remaining to mitigate the REP VOC emission liability to zero. Therefore, staff finds that by virtue of the District NSR program offset requirements for the REP NOx emissions, the REP VOC emissions (and NOx emissions) are fully mitigated, and recommend that no further VOC mitigation be required.

AIR QUALITY Table 12
CEQA Mitigation for REP NOx and VOC Emissions

	Tons/year
REP NOx Emission Liability (see AIR QUALITY Table 7c)	23.4
Total NO_2 ERCs to be surrendered for District NSR compliance without offset ratio	21.57
Remaining REP NOx Emission Liability	1.83
District has determined that 2.6 lbs VOC is equivalent to 1 lb NOx. Therefore to "mitigate" the remaining 1.83 tons NOx, 2.6x1.83 or 4.76 tons of VOC are needed	4.76
Total VOC ERC to be surrendered for District NSR compliance without offset ratio	67.02
VOC used for NOx mitigation	4.76
Remaining REP NOx Emission Liability	0
Remaining VOCs ERCs	62.24
REP VOC Emission Liability (see AIR QUALITY Table 7a)	13.42
Remaining REP VOC Emission Liability	0

While the REP SOx emissions are not expected to cause or contribute to a violation of the SO_2 ambient air quality standards, they can contribute to the downwind formation of PM10. As stated above, the offset ratios imposed by the District NSR rules, which are designed to improve the ambient air quality, are not necessary for CEQA evaluations.

AIR QUALITY Table 13 shows the highest REP PM10 emission liability between the LM6000 turbine option and the GTX100 turbine option (see **AIR QUALITY Table 7a**) to be 35.96 tons/year. In compliance with the District NSR rules, RE proposes to surrender 57.82 tons/year of PM10 ERCs. Following the CEQA assessment presented in **AIR QUALITY Table 13**, these PM10 ERCs would mitigate the REP PM10 emissions to zero with 21.86 tons/year of PM10 ERCs remaining.

Interpollutant trading ratios require significant, site specific analysis and no such analysis has been performed in this case for trading between SO_2 and PM10 ERCs. Although SO_2 ERCs are not being proposed for trading for PM10 ERCs in this case, in other cases they have been traded or, where proposed, to be traded at ratios ranging from 2:1 to 6:1 (that is 6 lbs of SO_2 for 1 lb of PM10). Based on molecular weight, one molecule of SO_2 may become one molecule of ammonium sulfate, which would correspond to an interpollutant trading ratio of 1.78 :1 (1.78 lbs of SO_2 for 1 lb of PM10). Thus, in each case where it was proposed, PM10 ERCs would have traded for SO_2 ERCs at a greater than 1:1 ratio. Therefore, to be conservative, staff proposes to allow, for the CEQA assessment only, an interpollutant-trading ratio of 1:1 (1lb of PM10 for 1 lb of SO_2).

Therefore, in this instance the PM10 ERCs of 21.86 tons shown in **AIR QUALITY Table 13** far exceed the potential impact from the REP SOx emissions of 6.83 tons. Therefore, staff finds that, by virtue of the District NSR program offset requirements for the REP PM10 emissions, the REP SOx emissions (and PM10 emissions) are fully mitigated, and recommend that no further SOx mitigation be required.

AIR QUALITY Table 13
CEQA Mitigation for REP PM10 and SOx Emissions

	Tons/year
REP PM10 Emission Liability (see AIR QUALITY Table 7a)	35.96
Total NO2 ERCs to be surrendered for District NSR compliance without offset ratio	57.82
Remaining REP PM10 Emission Liability	0
Remaining PM10 ERCs	21.86
There is no PM10 to SO2 trading ratio that has been established for the REP case, however all such trading ratios favor 2 or more lbs of SO2 for 1 lbs of PM10. To be conservative, staff proposes a 1 to 1 trading ratio. Thus, for the REP case only, 21.86 tons of PM10 will “mitigate” 21.86 tons of SO2.	21.86
REP SOx Emission Liability (see AIR QUALITY Table 7a)	6.83
Remaining REP SOx Emission Liability	0

STAFF PROPOSED MITIGATION

Construction

In addition to the mitigation measures proposed by RE, staff proposes the following mitigation measures that have become standard in staff recommended construction mitigation. It has been staff's experience that these measures are effective mitigation and do not represent a significant burden to the applicant. With these additional mitigation measures, staff is reasonably confident that the REP construction emission impacts will be mitigated to a level of insignificance.

- All diesel-fueled engines used in the construction of the facility shall be fueled with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.
- Diesel-fueled construction equipment will meet the Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or better, or will employ suitable catalyzed diesel particulate filters.
- All construction equipment will not remain running at idle for more than five minutes.

Additionally, the District has proposed construction conditions (PCAPCD 2004a) that are standard when the District is lead agency in the CEQA review process and these conditions are included in the West Roseville Specific Development Plan. Since these conditions are not tied to any District rule or regulation, the District has requested that the Commission consider adopting them in the REP case. In reviewing the conditions, staff finds that they are very similar to the construction conditions that the Commission currently uses on all power plants licensing cases (see Conditions of Certification AQ-SC1 through 5). There are two conditions that the District has proposed that the Commission does not currently require.

The District proposes that RE reduce the construction fleet-average NOx emissions by 20 percent and the particulate emissions by 45 percent as compared to the most recent CARB fleet average (the fleet is to consist of all heavy duty equipment 50 bhp or greater). Staff has investigated this restriction, but finds that the staff proposed restriction to CARB Tier 1 diesel engines and the exclusive use of CARB ultra-low sulfur diesel fuel either equal or exceed the benefits of the District proposed condition.
The District also proposes to allow RE to use emulsified diesel fuel (a mixture of diesel and water) to reduce NOx emissions in order to attain the 20 percent emission reduction discussed above. Staff has investigated this option and finds that while emulsified diesel fuel is available, the NOx reduction benefits may be outweighed by the reduced capacity of the equipment and possibly increased PM10 emissions. Coupled with the required on-site mixing of this fuel and the limited construction cycle of the REP project, staff finds that this is an unwarranted mitigation measure.

Operation

Federally Enforceable Limitation

As discussed above, RE is investigating opportunities for obtaining further offsets for the REP project air quality emission impacts at Energy 2001 and/or the SMAQMD Community Bank. As originally proposed, RE did not offer sufficient ERCs to offset the

REP air quality emission impacts based on full project operation. Thus, there would be remaining unmitigated significant impacts. In addition to the original mitigation, RE now proposes to accept a federally enforceable operational constraint that would restrict emissions on a quarterly basis equivalent to the ERCs presently proposed (as shown in **AIR QUALITY Table 7b**). This constraint could be removed later if RE is able to provide further offsets. However, part of the NO_2 ERCs to be surrendered for this limit are predicated on the assumption that NO_2 ERCs will be developed or secured and surrendered 30 days prior to REP operation. Because of the speculative nature of developing ERCs from the Energy 2001 facility or purchasing them from the SMAQMD Community Bank, it is staff's opinion that the federally enforceable limit be set to a lower limit that excludes the NO_2 ERCs to be developed. Therefore, staff recommends the quarterly and annual emission limits for NOx as shown in **AIR QUALITY Table 7c**.

Ammonia Slip Mitigation

RE has chosen to comply with BACT by using an ammonia injected SCR system. However, they have also proposed to limit the ammonia slip rate to no more than 10 ppm @ 15 percent O_2 averaged over one-hour, rather than the five ppm @ 15 percent O_2 averaged over three-hours level that staff recommends.

As discussed previously, the District is (or is recommended to be) classified as non-attainment for both the PM10 and PM2.5 state ambient air quality standards. Staff also reasonably concluded that the District is most likely in an ammonia-limited area, such that emitting additional ammonia is likely to lead to further PM2.5 formation. Thus, it is staff's position that the release of ammonia from the REP facility may contribute to further violations of the PM10/PM2.5 state ambient air quality standards, although the amount of ammonia ultimately converted to PM2.5 cannot be precisely quantified.

To reduce the degree to which ammonia from excessive ammonia slip would contribute to the formation of PM2.5, staff recommends that the REP ammonia slip be limited to no more than five ppm @ 15 percent O_2 averaged over three hours.

In staff's experience, it is not technically prohibitive or infeasible to limit ammonia slip to five ppm. In fact, the South Coast Air Quality Management District, a recognized leader among air districts, has been requiring five ppm ammonia slip over the past two years as part of their BACT/LAER requirements. The South Coast AQMD proposed this rule change based, in part, on the CARB Guidance Document (9/99) that recommended that air districts establish a health protective ammonia slip limit at or below five ppm for combined cycle power plants. In fact, the recent Malburg Generation Station (Vernon City), licensed by the Commission, includes a five ppm ammonia slip limit for their GTX100 combined cycle power plant, a two on one design (two CTGs on one steam turbine) that is very similar to the REP proposal.

District Proposed CEQA Mitigation

The District has proposed operational conditions (PCAPCD 2004a) that are included in the West Roseville Specific Development Plan and are standard when the District is the CEQA lead agency. Since these conditions are not part of any District rule or regulation, the District has requested that the Commission consider adopting them as

the CEQA lead agency in the REP case. Staff has investigated the following District recommended measures:

- Landscape with native drought-resistant species (plants, trees and bushes) to reduce the demand for gas powered landscape maintenance equipment.
    - Staff finds that this requirement is consistent with an over all approach by the District to reduce area emissions. However, a similar condition is included in staff's **Visual Resources** section as VIS-5, which requires the project owner to submit a landscaping plan consistent with the design guidelines for the West Roseville Specific Plan. Therefore, such a condition need not be repeated in this section.
- All truck loading and unloading docks shall be equipped with one 110/208 volt power outlet for every two dock doors. Diesel trucks shall be prohibited from idling more than five minutes and must be required to connect to the 110/208 volt power to run any auxiliary equipment. Signage shall be provided.
    - Staff finds that this measure is primarily intended for trucks that are parked and would otherwise remain idling for extended periods (6 hours or more) such as those with refrigerated units. Staff does not anticipate that such trucks would be utilized during operation of the REP project, so this condition is unnecessary.
- HVAC units shall be equipped with PremAir (or other manufacturer) catalyst system if available and economically feasible at the time building permits are issued. The PremAir catalyst can convert up to 70 percent of ground level ozone that passes over the condenser coils into oxygen. The PremAir system is considered feasible if the additional cost is less than 10 percent of the base HVAC unit.
    - The emission reduction possible as a result of this mitigation measure is minimal from a single unit; however, the application of this technology across a wide area, such as the area delineated by the Western Roseville Specific Development Plan, may result in significant reductions in ambient ozone concentrations. Since the REP will likely install only a few air conditioning units, this mitigation measure is unlikely to be a significant burden to RE. Therefore, staff recommends Condition of Certification **AQ-SC10**.
- The roads and parking areas at the plant shall be paved.
    - From the plot plans, staff understands that the majority of the parking area and facility at the REP project site will be paved prior to normal operation. Therefore, staff recommends Condition of Certification **AQ-SC11**.
- Off road equipment such as forklifts shall utilize electric or propane for drive power whenever possible.
    - The wide spread use of alternative fueled equipment is a proven technique to reducing local emissions and their impacts. Staff recommends Condition of Certification **AQ-SC12**.

COMPLIANCE WITH LORS

FEDERAL

As discussed earlier, the PSD requirements apply only to projects that exceed 100 tons per year for any pollutant (known as major sources). Since, REP's emissions do not exceed 100 tons per year for any criteria pollutant, the project is not subject to PSD permitting requirements.

STATE

RE has demonstrated that the REP will comply with Section 41700 of the California State Health and Safety Code with the District Final Determination of Compliance.

LOCAL

Compliance with specific District rules and regulations are discussed in the FDOC (PCAPCD 2004b).

RESPONSE TO PUBLIC COMMENTS

COMMENT: ROSEVILLE JOINT UNIFIED HIGH SCHOOL DISTRICT

Staff received a comment from Mr. Christopher Grimes of the Roseville Joint Unified High School District, dated October 18, 2004. While Mr. Grimes' comments are directed at the potential cooling tower plume visual impacts from REP (please see the Visual section of this staff assessment), which are not discussed in the air quality section of the FSA, he does make reference to the mitigation of air quality impacts.

Staff Response

In a meeting with representatives of the Roseville Joint Unified High School District, staff presented the following points.

- AIR QUALITY Table 10 shows the maximum air emission impacts from the REP.
- Existing background PM10 concentrations already exceed the ambient air quality standards. The proposed REP will add to these exceedences.
- Modeling shows maximum impacts to be approximately 98 meters (321 feet) south-southeast of the REP project site. At the proposed school site (1800 feet, south-southeast), the emission impacts will disburse to near zero concentration.
- Modeling estimates are intended to be as conservative as possible without being over conservative.
    1. Background PM10 concentrations represented with recent high values measured in 2001 and 2002.
    2. Model run for the years from 1992 through 1996 with the impacts predicted for the highest annual and 24-hour averages over that entire period.
- The REP facility has fully mitigated air quality emission impacts to a level of insignificance through the PCAPCD New Source Review program

- With the limiting Conditions of Certification proposed by staff, the criteria air pollution emissions of REP present no significant impact on the ambient air quality.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the REP operational emissions of NOx would be fully mitigated to a level of insignificance and would not have the potential to cause a direct impact on the state or federal NO_2 ambient air quality standards or to contribute to the downwind formation of ozone or secondary PM10/PM2.5 with the limitations provided herein. Staff has determined that RE has not retained sufficient control over a portion of the NO_2 ERCs (those to be developed at the Energy 2001 Landfill Gas-to-Energy Facility) that are necessary to offset the REP project emissions. Staff therefore recommends Condition of Certification **AQ-SC8**.

Staff has determined that the REP operational emissions of SOx would be fully mitigated to a level of insignificance and would not cause or contribute to a violation of any of the SO_2 state or federal ambient air quality standards or to act as a precursor to the downwind formation of secondary PM10/PM2.5 with the limitations provided herein.

Staff has determined that the REP operational emissions of VOC would be fully mitigated to a level of insignificance and would not contribute to the downwind formation of ozone with the limitations provided herein.

Staff has determined the REP operational PM10 emissions would be fully mitigated to a level of insignificance and would not contribute to existing PM10 violations of the state PM10 ambient air quality standards with the limitations provided herein.

Staff has determined that the REP operational emissions of CO would not cause or contribute to a violation of the state or federal CO ambient air quality standards and thus does not represent a significance impact on the ambient air quality.

To minimize the formation of secondary PM2.5 from excessive ammonia slip, staff recommends that the REP ammonia slip be limited to no more than 5 ppm @ 15 percent O_2 averaged over 3 hours. RE is proposing an ammonia slip limit of 10 ppm @ 15 percent O_2, although staff concludes that 5 ppm @ 15 percent O_2 would pose no significant financial or technical burden.

The District has submitted an FDOC (PCAPCD 2004b) that concludes that the REP would comply with all applicable District rules and regulations and therefore has proposed a set of conditions presented here as Conditions of Certification **AQ-1** through **AQ-122**.

Commission staff recommends the inclusion of additional Conditions of Certification AQ-SC1 through AQ-SC9 that address the construction impacts and ensures that RE complies with the assumptions made in this assessment. Staff further recommends the inclusion of Conditions of Certification **AQ-SC10** through **AQ-SC12** as requested by the District.

Staff therefore recommends the certification of the REP with the following proposed Conditions of Certification:

CONDITIONS OF CERTIFICATION

COMMISSION STAFF RECOMMENDED CONDITIONS

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

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and any air quality construction mitigation monitors. The AQCMM and all delegated monitors must be approved by the CPM before the start of ground disturbance.

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

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

AQ-SC3 The AQCMM shall submit to the CPM, in the Monthly Compliance Report (MCR), a construction mitigation report that demonstrates compliance with the following mitigation measures for the purposes of preventing fugitive dust plumes from leaving the Project site and controlling other construction-related emissions. 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 prevention of fugitive dust plumes). The frequency of watering can be 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 cleaned 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 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 runoff 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 shall be treated with appropriate dust suppressant compounds.

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

n) Diesel-Fueled Engines

   (1) All diesel-fueled engines used in the construction of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.

   (2) 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.

(3) All construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the Tier 1 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 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" if, among other reasons:

a. 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

b. The construction equipment is intended to be on-site for ten (10) days or less.

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

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

a. The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.

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

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

d. Any other seriously detrimental cause which has the approval of the CPM prior to the termination being implemented.

(4) All heavy earthmoving equipment and heavy duty construction related trucks with engines meeting the requirements of (n)(3) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

(5) All heavy construction equipment with engines meeting the requirements of (n)(3) above shall not remain running at 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) copies of all diesel fuel purchase records, (3) copies of any complaints filed with the air district in relation to project construction, (4) 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 equipment has been properly maintained, and (5) 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 The AQCMM shall continuously monitor the construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMM shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

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

Step 2: The AQCMM 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 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 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 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 in the monthly compliance report detailing all observances by the AQCMP and mitigation actions taken.

AQ-SC5 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-SC6 The project owner shall maintain records of fuel use, emission and operational data sufficient to demonstrate compliance with the Conditions of Certification referenced herein.

Verification: The project owner shall submit to the CPM Quarterly Air Quality Reports no later than 30 days after the end of each calendar quarter.

AQ-SC7 The project owner shall report to the CPM the quantities of each greenhouse gas (GHG) emitted on an quarterly basis as a result of facility operation. GHG emissions shall be reported as equivalent CO_2 pounds. The identification of each GHG and the method to estimate CO_2 equivalent emissions shall conform to the California Climate Action Registry General Reporting Protocol for power plants.

Verification: GHG emissions shall be reported to the CPM as part of the Quarterly Air Quality Reports required by Condition of Certification AQ-SC6.

AQ-SC8 The project owner shall be limited to 23.4 tons of NOx emissions per year from the facility as a whole including both combustion turbine exhaust stacks, the auxiliary boiler exhaust stack, the emergency IC engine and the firewater pump engine exhaust until compliance with Conditions of Certification AQ-6, -7, -8 and –9 has been demonstrated. This emission limit supercedes the emission limits in Conditions of Certification AQ-60, -61, -62 and –63.

Verification: The project owner shall include all operational data necessary to demonstrate compliance with this condition as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6 or the verification of compliance required in Conditions of Certification AQ-6, -7, -8 and -9.

AQ-SC9 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 any change to a Condition of Certification regarding air quality, as an insignificant change, 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-SC10 All HVAC units installed at the project site shall be equipped with PremAir (or other equivalent manufacturer) catalyst system.

Verification: The project owner shall submit to the CPM for approval and maintain on site for five years a copy of all receipt of sales and proof of professional installation of the PremAir system or equivalent system.

AQ-SC11 All roads and parking areas at the facility shall be paved.

Verification: The project owner shall submit to the CPM no less than one day prior to first fire, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the roads and parking

areas and certifies that all roads and parking areas at the facility have been suitably paved.

AQ-SC12 All off road equipment material handling or loading equipment shall utilize electric or propane for drive power.

Verification: Thirty days prior to first fire and annually thereafter, the project owner shall submit to the CPM for approval a complete inventory of all material handling or loading equipment used or stored on site. This list shall indicate the storage location, primary use, manufacturer, size and primary energy source of each piece of equipment.

SPECIFIC FACILITY CONDITIONS

Offsets

AQ-1. If the GE LM-6000 turbines are selected, emission offsets shall be provided for all calendar quarters for NO_x and PM10 in the following amounts, at the offset ratio specified in the PCAPCD Rule 502, New Source Review (8/01). (Offsets are not required for CO, SO_x and VOC emissions under PCAPCD Rules and Regulations.)

GE LM6000 - OFFSETS REQUIRED					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
PM10	17,523	15,246	18,999	18,788	35.28

Verification: The project owner shall submit to the CPM documentation from the PCAPCD showing that all ERCs identified in Condition of Certification AQ-2 have been surrendered as required if the GE LM6000 turbines are selected.

AQ-2. The ERC certificates to be surrendered if the GE LM-6000 turbines are selected shall include the following:

NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-23 (2004-03)	5,050	5,050	5,050	5,050	10.1
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	6,199	0	3,188	4.69
Calpine Corp.	YSAQMD/ EC-210	0	9,558	0	3,973	6.77
Energy 2001 or SMAQMD Bank		5,300	5,300	5,250	4,150	10.00
VOCs for NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of	PCAPCD/	33,512	33,512	33,512	33,512	67.0

Roseville	2001-26 (2004-04)					
PM10	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-24 (2004-04)	22,680	0	13,252	21,490	28.71
City of Roseville	PCAPCD/ 2001-22 (2004-02)	2,578	19,820	16,085	15,916	27.20

Verification: The project owner shall submit to the CPM documentation from the PCAPCD showing that all ERCs identified in this Condition have been surrendered as required in Conditions of Certification AQ-5,-6,-7,-8 and -9 if the GE LM6000 turbines are selected.

AQ-3. If the Alstom GX100 turbines are selected, emission offsets shall be provided for all calendar quarters for NO_x and PM-10 in the following amounts, at the offset ratio specified in the PCAPCD Rule 502, New Source Review (8/01). (Offsets are not required for CO, SOx and VOC emissions under PCAPCD Rules and Regulations.)

ALSTOM GX100 - OFFSETS REQUIRED					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
PM10	17,673	15,513	19,168	19,158	35.95

Verification: The project owner shall submit to the CPM documentation from the PCAPCD showing that all ERCs identified in Condition of Certification AQ-4 have been surrendered as required if the Alstom GTX100 turbines are selected.

AQ-4. The ERC certificates to be surrendered If the Alstom turbines are selected shall include the following:

NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-23 (2004-03)	5,050	5,050	5,050	5,050	10.1
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	6,199	0	3,188	4.69
Calpine Corp.	YSAQMD/ EC-210	0	9,558	0	3,973	6.77

Energy 2001 or SMAQMD Bank		5,300	5,300	5,250	4,150	10.00
VOCs for NOx	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-26	33,512	33,512	33,512	33,512	67.0
PM10	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-24	2,578	20,167	16,085	15,916	27.37
City of Roseville	PCAPCD/ 2001-22	22,680	-	13,440	22,680	29.40
Enron North America	PCAPCD/ 22001-24 (2004-06)	362	-	420	-	0.39

Verification: The project owner shall submit to the CPM documentation from the PCAPCD showing that all ERCs identified in this Condition have been surrendered as required in Conditions of Certification AQ-5,-6,-7,-8 and -9 if the Alstom GTX100 turbines are selected.

AQ-5. The ERC Certificates PCAPCD 2001-23, YSAQMD EC-209 (EC-238), YSAQMD EC-210, PCAPCD 2001-26, PCAPCD 2001-24 and PCAPCD/ 2001-22 shall be submitted to the PCAPCD with copies submitted to the CPM prior to start of construction. For the purpose of this condition, start of construction shall be defined as the pouring of foundation on site. The project owner shall submit copies of a PCAPCD confirmation that the ERCs identified have been surrendered at the specified time and amounts to the CPM.

Verification: The ERC certificates identified above shall be surrendered to the PCAPCD in the amounts shown in either Condition of Certification AQ-2 or –4 based on the turbine selection at least 30 days prior to the commencement of construction with copies of the confirmation of surrender being sent to the CPM no later than 30 days following the commencement of construction.

AQ-6. ERCs obtained from reductions at Energy 2001 shall be submitted to the PCAPCD prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein. The project owner shall submit copies of a PCAPCD confirmation that the ERCs identified have been surrendered at the specified time and amounts to the CPM.

Verification: ERCs obtained from the Energy 2001 shall be surrendered to the PCAPCD at least 30 days prior to the commencement of operation with copies of the confirmation of surrender being sent to the CPM no later than 30 days following the commencement of operation.

AQ-7. The NOx ERCs listed in the Energy 2001 row may alternatively be obtained in part at or in whole from the Sacramento Air Quality Management District (SMAQMD) Bank at an offset ratio of 2.1 to 1. The offset ratio of 1.3 to 1 shall apply to Energy 2001 offsets. An offset ratio of 2.1 to 1 shall apply to SMAQMD Bank offsets. The combined quantity shall be sufficient to offset the following NOx emissions:

NOx	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	4,077	4,077	4,038	3,192	7.69

Compliance to be determined by the following :

(NOx ERCs Energy 2001 /1.3) + (NOx ERCs SMAQMD Bank /2.1) = Quarterly requirement.

Verification: The project owner shall notify the CPM and PCAPCD in writing in coincidence with the submittal of the necessary application to the SMAQMD for NOx ERCs from the SMAQMD Bank. The notification shall include at a minimum the application submitted to the SMAQMD and the formula herein completed for each quarter and annual total.

AQ-8. ERCs obtained from the SMAQMD Bank shall be submitted to the PCAPCD prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein. The project owner shall submit copies of a PCAPCD confirmation that the ERCs identified have been surrendered at the specified time and amounts to the CPM.

Verification: ERCs obtained from the SMAQMD Bank shall be surrendered to the PCAPCD at least 30 days prior to the commencement of operation with copies of the confirmation of surrender being sent to the CPM no later than 30 days following the commencement of operation.

AQ-9. Prior to the use of ERCs from the SMAQMD Bank, project owner shall appear before the PCAPCD District Board and gain approval of the transfer of ERCs per Health and Safety Code, Section 40709.6, Offset by reduction to stationary source located in another District.

Verification: The project owner shall notify the CPM at least 30 days prior to the intend PCAPCD Board appearance.

AQ-10. The gas turbines and auxiliary boiler shall be fired exclusively on pipeline grade natural gas.

Verification: The project owner shall submit to the CPM a written statement from a California registered Professional Engineer stating that said engineer has reviewed the

as-built-designs or personally inspected the identified equipment and verifies that said equipment is plumbed exclusively for natural gas combustion.

AQ-11 The project owner shall maintain an Operating Compliance Plan for the new CTG/HRSG which will assure that the air pollution control equipment will be properly maintained and that necessary operational procedures are in place to continuously achieve compliance with this permit. The Operating Compliance Plan shall include a description of the process monitoring program and devices to be provided.

The plan shall specify the frequency of surveillance checks that will be made of process monitoring devices and indicators to determine continued operation within permit limits. A record or log of individual surveillance checks shall be kept to document performance of the surveillance.

a. The plan shall include the frequency and methods of calibrating the process monitoring devices.

b. The plan shall specify for each emission control device:
   i. Operation and maintenance procedures that will demonstrate continuous operation of the emission control device during emission-producing operations; and
   ii. Records that must be kept to document the performance of required periodic maintenance procedures.

c. The plan shall identify what records will be kept to comply with air pollution control requirements and regulations and the specific format of the records. These records shall include at least the Recordkeeping information required by this permit. The information must include emission monitoring evaluations, calibration checks and adjustments, and maintenance performed on such monitoring systems.

d. The plan shall be submitted to the PCAPCD and the CPM 30 days prior to startup of the gas turbines and boiler. The plan must be implemented upon approval by the Air Pollution Control Officer.

e. The plan shall be resubmitted to the PCAPCD for approval upon any changes to compliance procedures described in the plan, or upon the request of the Air Pollution Control Officer.

Verification: The project owner shall submit the Operating Compliance Plan to the PCAPCD and the CPM 30 days prior to startup of the gas turbines and boiler for PCAPCD approval. The project owner shall resubmit the Operating Compliance Plan to the PCAPCD and the CPM for PCAPCD approval upon any changes to compliance procedures described in the plan, or upon the request of the Air Pollution Control Officer.

AQ-12 Continuous Emission Monitoring System Remote Polling:

a. The project owner shall install and maintain equipment, facilities, software and systems at the facility and at the PCAPCD office that will allow the PCAPCD to poll or receive electronic data from the CEMS. The project owner shall make CEMS data available for automatic polling of the daily

records. The project owner shall make hourly records available for manual polling within no more than a one hour delay. The basic elements of this equipment include a telephone line, modem and datalogger. Alternatively, an internet based system may be used. The costs of installing and operating this equipment, excluding PCAPCD costs, shall be borne by the REP.

b. Upon notice by the PCAPCD that the facility's polling system is not operating, the REP shall provide the data by a PCAPCD-approved alternative format and method for up to a maximum of 30 days.

c. The polling data is not a substitute for other required recordkeeping or reporting. (Rule 404 § C; Rule 501 § 304.2.c; HSC 42706)

Verification: The project owner shall submit to the CPM a written statement from a California registered Professional Engineer stating that said engineer has reviewed the as-build-designs or inspected the equipment identified and certifies its proper operation with the PCAPCD requirement and specifications no more than 180 days following the cessation of the commissioning period.

Operating Limitations

AQ-13 The hours of operation of each gas turbines shall not exceed the following:

Power Plant Gas Turbine Operating Schedule					
	1st	2nd	3rd	4th	Annual
Total operating hours	2,096	1,864	2,132	2,145	8,237

Verification: The project owner shall include all operational data identified in this condition as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6.

AQ-14 The project owner shall submit design details for the selective catalytic reduction, oxidation catalyst, and continuous emission monitor system to the PCAPCD and the CPM prior to commencement of construction of these components.

Verification: The project owner shall submit the designs identified in this condition to the PCAPCD and the CPM at least 30 days prior to commencement of construction of the identified components.

AQ-15 The project owner shall install a selective catalytic reduction (SCR) system and an oxidation catalyst on the gas turbine. The SCR and oxidation catalyst equipment shall be operated whenever the gas turbine is operated.

Verification: The project owner shall submit to the CPM a written statement by a California registered Professional Engineer stating that said engineer has reviewed the

as-built-designs or inspected the identified equipment and certifies that it is operational and air tight. The project owner shall include the operational status of the SCR and oxidation catalyst during all hours of operation as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6.

AQ-16 The gas turbine engine and generator lube oil vents shall be equipped with mist eliminators.

Verification: The project owner shall submit to the CPM no less than one day prior to commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the gas turbine engine and generator lube oil vents are equipped with mist eliminators.

AQ-17 The gas turbines and auxiliary boiler shall be equipped with continuously recording, nonresettable fuel gas flowmeters on each unit.

Verification: The project owner shall submit to the CPM no less than one day prior to commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the gas turbines and auxiliary boiler are equipped with continuously recording, nonresettable fuel gas flowmeters on each unit.

AQ-18 Each gas turbine exhaust shall be equipped with continuously recording emissions monitor for NOx, CO, and O_2 dedicated to this unit. Continuous emission monitor shall meet the requirements of 40 CFR parts 60 and 75, and shall be capable of monitoring emissions during startups and shutdowns as well as normal operating conditions. The system shall be installed and operational prior to initial startup of the turbines.

Verification: The project owner shall submit to the CPM no less than one day prior to commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that each gas turbine exhaust is equipped with an operational CEMS meeting the specifications in this condition.

AQ-19 The gas turbine exhaust stacks and boiler exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. Access ladders and/or stairs and platforms shall allow easy access to the sampling ports.

Verification: The project owner shall submit to the CPM no less than one day prior to commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that each gas turbine exhaust is air tight and equipped with sampling ports that are easy to access as required by this condition.

AQ-20 The gas turbine engine shall be fired exclusively on pipeline quality natural gas with a sulfur content no greater than 0.50 grains of sulfur compounds per 100 dry scf of natural gas.

Verification: The project owner shall submit to the CPM the most recent fuel testing analysis performed as part of the Quarterly Air Quality Report required in Conditions of Certification AQ-SC6.

AQ-21 Startup is defined as the period beginning with turbine light-off (firing) until the unit meets the lb/hr and ppmv emission limits in Conditions of Certification AQ-52, -54 and -55. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown durations shall not exceed 3.0 hours and one hour, respectively, per occurrence.

Verification: The project owner shall identify and submit to the CPM as part of the Quarterly Air Quality Report all startups and shutdowns for all units including the maximum hourly emission rate, total emissions and duration.

AQ-22 NOx, excluding the thermal stabilization period (i.e. startup period which is not to exceed three hours), shall not exceed the following levels under load conditions:

9 x EFF/25 ppm, @ 15% O2, averaged over 15 minutes:

Where: EFF(efficiency) is the higher of the following:

$$EFF_1 = \frac{3412 \times 100\%}{AHR}$$

AHR = Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

or

$$EFF_2 = \frac{MRE \times LHV}{HHV}$$

MRE = Manufacturer's Rated Efficiency with Air Pollution Equipment at LHV.], which is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution equipment after correction from LHV to HHV of the fuel at peak load for that facility.

Verification: The project owner shall maintain the NOx emission records required by this condition on site and shall make these records available for inspection upon request of the PCAPCD or CPM.

Commissioning

AQ-23 The commissioning period commences when all mechanical and electrical systems are installed and individual startup has been completed, or when a gas turbine is first fired, whichever comes first. The period ends when the plant has completed performance testing and is available for commercial operation.

Verification: The project owner shall submit for approval to the CPM, a general plan to begin, implement and complete all commissioning activities no less than 30 days prior to the expected date of the commencement of commissioning. This general plan

shall include dates for implementing and completing all major milestones of commissioning. The project owner shall notify the CPM in writing of the completion of each milestone of this general plan, within five business days of the date of completion of each milestone.

AQ-24 The gas turbines shall be tuned to minimize the air emissions. At the earliest feasible time, in accordance with the recommendations of the equipment manufacturer and construction contractor, the air pollution control equipment shall be installed, adjusted and operated to minimize emissions from the combustion turbines.

Verification: The general plan required in the verification of Condition of Certification AQ-26 shall specifically include, but is not limited to, dates regarding turbine tuning and the installation, adjustment and operation of the air pollution control equipment.

AQ-25 The total number of firing hours of each gas turbine without abatement shall not exceed 160 hours during the commissioning period. Such operation shall only be limited to such activities that can only be properly executed without the air pollution control equipment.

Verification: The general plan required in the verification of Condition of Certification AQ-26 shall specifically include, but is not limited to, the total estimated hours of operation under all operational conditions. In reporting the completion of each milestone, the project owner shall include the actual number of hours of operation in total and for that milestone.

AQ-26 During the commissioning operations, CO emissions shall not exceed 829 pounds per hour for any one-hour block average. Compliance to be determined by CEMS measurements. (This condition was established to prevent impacts from exceeding 500 ug/m3 over an eight-hour average).

Verification: The general plan required in the verification of Condition of Certification AQ-23 shall specifically include, but is not limited to, an estimate of expected hourly fuel use and CO emissions in all fuel burning equipment. In reporting the completion of each milestone, the project owner shall include the actual hourly fuel use of all fuel burning equipment and the actual CO emission recorded by the CEMS or, if the CO CEMS is uncertified at the time, a CO emission estimate via a CPM approved fuel based CO emission factor.

AQ-27 The total mass emissions of each regulated pollutant that are emitted during the period shall not exceed the quarterly emission limits specified in these conditions.

Verification: The general plan required in the verification of Condition of Certification AQ-23 shall specifically include, but is not limited to, an estimate of expected fuel use and emissions in all fuel burning equipment. In reporting the completion of each milestone, the project owner shall include the actual fuel use by quarter of all fuel burning equipment and the actual emissions, by quarter, of NOx, SOx, CO, VOC and PM10 as recorded by the CEMS if available or via a CPM approved fuel based emission factor.

Reporting and Record Keeping

AQ-28 The project owner shall submit a CEMS QA/QC plan to the PCAPCD and the CPM for approval. Approval should also be required for any future changes to the plan.

Verification: The project owner shall submit the initial CEMS QA/QC plan to the PCAPCD and the CPM for approval at least 30 days prior to the installation of the CEMS.

AQ-29 The project owner shall submit to the PCAPCD and CPM, prior to issuance of a Permit to Operate, information correlating the control system operating parameters to the associated NOx, CO, PM10, VOC and SOx emissions. This information may be used by the PCAPCD Air Pollution Control Officer or CPM to determine compliance when there is no continuous emission monitoring system available or when the continuous emission monitoring system is not operating properly.

Verification: The project owner shall submit to the APCO and CPM information correlating the control system operating parameters to the associated emissions no less than 10 days prior to the termination of the commissioning period.

AQ-30 Provide source test information annually regarding the exhaust gas NOx concentration at ISO conditions corrected to 15 percent oxygen on a dry basis, and the demonstrated percent efficiency (EFF) of the turbine unit.

Verification: The project owner shall submit to the CPM source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the results of the source test no less than 60 days following the actual source test date.

AQ-31 Maintain a gas turbine operating log that includes, on a daily basis, the actual Pacific Standard Time start-up and stop time, total hours of operation, type and quantity of fuel used (liquid/gas). This information shall be available for inspection at any time from the date of entry.

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon request from the PCAPCD or CPM.

AQ-32 The project owner shall maintain hourly records of NOx and CO emission concentrations (ppmv @ 15percent 0_2), and hourly, daily, and quarterly records of NOx and CO emissions. Ongoing compliance with the CO emission limits during normal operation shall be deemed compliance with the VOC emission limits during normal operation.

Verification: The project owner shall submit to the CPM all concentration, hourly, daily and quarter NOx and CO emissions as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6.

AQ-33 The project owner shall maintain records of SOx lb/hr, lb/day, and lb/quarter emissions. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations.

Verification: The project owner shall submit to the CPM all hourly, daily and quarterly SOx emissions as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6.

AQ-34 The project owner shall maintain the following records: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, maintenance of any continuous emission monitor; emission measurements, total daily and rolling twelve month average hours of operation, hourly quantity of fuel used, and gross three hour average operating load.

Verification: The project owner shall submit to the CPM all data identified in this condition as part of the Quarterly Air Quality Report required by Condition of Certification AQ-SC6.

AQ-35 All records required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for PCAPCD inspection upon request. Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P. paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the PCAPCD, the ARB, and the EPA.

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon reasonable notice from the PCAPCD or CPM.

AQ-36 The project owner shall notify the PCAPCD of any breakdown condition as soon as reasonably possible, but no later than two PCAPCD business hours after its detection.

Verification: The project owner shall include the identification of all breakdowns, PCAPCD notification, resulting excess emission (if any) and corrective actions taken (if any) as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-37 Any violation of any emission standard listed in this permit which is indicated by the CEMS shall be reported to the PCAPCD no later than 96 hours after such occurrence per California Health and Safety Code 42706.

Verification: The project owner shall include all violations of emission standards and corresponding PCAPCD notifications in the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-38 The PCAPCD shall be notified in writing within seven calendar days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations.

Verification: The project owner shall include the identification of all breakdowns, PCAPCD notification, resulting excess emission (if any) and corrective actions taken (if

any) as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-39 Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The PCAPCD shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the PCAPCD.

Verification: The project owner shall submit to the CPM all CEMS audits, relative accuracy tests and related transmittal memos (to the PCAPCD) within 60 days following the date of audit or test performance.

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

Verification: The project owner shall include all CEMS quality assurance test failures that required corrective action as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-41 The project owner shall submit a written report to the APCO and the CPM for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred.

Verification: The project owner shall include the excess emission report as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-42 The project owner shall provide the PCAPCD and CPM with a written emission statement showing actual emissions of volatile organic compounds and oxides of nitrogen. Pursuant to PCAPCD Rule 503 the project owner shall submit this emission statement on a form or in a format specified by the Air Pollution Control Officer. The statement shall contain the following information:

a. Information contained in the California Air Resources Board's Emission Inventory Turn Around Document as described in Instructions for the Emission Data System Review and Update Report;

b. Actual emissions of volatile organic compounds and oxides of nitrogen, in tons per year, for the calendar year prior to the preparation of the emission statement;

c. Information regarding seasonal or diurnal peaks in the emission of affected pollutants; and

d. Certification by a responsible official of the project owner that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the emission statement.

Verification: The project owner shall submit to the CPM the emission statement described herein prior to the beginning of March each year.

Performance Testing

AQ-43 Compliance with the short term emission limits (lb/hr and ppmv @ 15percent O2) shall be demonstrated by a performance test conducted within 60 days of reaching maximum production and not later than 180 days from initial startup of each gas turbine engine.

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

AQ-44 A performance test shall be conducted annually for each combustion turbine/heat recovery steam generator unit each calendar year.

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

AQ-45 Compliance with the cold start NOx, and CO mass emission limits shall be demonstrated for each of the gas turbines by performance testing after initial operation and at least every seven years thereafter by an ARB certified independent test firm.

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing. The initial performance test shall be completed no later than 180 days after initial operation.

AQ-46 The following test methods shall be used: PM10:EPA method 201 and 201A in conjunction with ARB method 5, NOx: EPA Method 20, CO: EPA method 10, 02: EPA Method 3A, VOC: EPA method 18, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the PCAPCD and CPM may also be used to address the source testing requirements of this permit.

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

Emission Limitations

AQ-47 No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite nuisance complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-48 Stack emission opacity as dark or darker than Ringelmann No. 1 (20 percent opacity) for period(s) aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite opacity complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-49 Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions. (Rule 210)

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

AQ-50 Sulfur compound emissions calculated as SO_2 shall not exceed 0.2 percent by volume. (Rule 210).

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

AQ-51 The ammonia slip shall not exceed 5 ppmv @ 15 percent O_2 averaged over 3 hours.

Protocol: Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure:

ammonia slip ppmv @ 15% O_2 = ((a-(bxc/1,000,000)) x 1,000,000 / b) x d,

where

a = ammonia injection rate(lb/hr)/17(lb/lb. mol),

b = dry exhaust gas flow rate (lb/hr)/(29(lb/lb. mol),

c = change in measured NOx concentration ppmv at 15% O_2 across catalyst, and

d = correction factor.

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

Verification: The project owner shall include ammonia slip concentrations averaged on an hourly basis calculated via the protocol provided as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-52 The emissions from the gas turbine after air pollution controls shall not exceed the following:

Gas Turbine PPMV Limitations Excluding Startup and Shutdown		
NO_X	CO	VOC
2.0 ppmvd @ 15% O_2, 1-hour average	4 ppmvd @ 15% O_2, 3-hour average	2 ppmv @ 15% O_2, 1-hour average

Verification: The project owner shall submit to the PCAPCD and CPM a performance test protocol for approval 30 days prior to the planned source test date. The project owner shall submit all performance test results no less than 60 days following the actual date of performance testing.

AQ-53 The 2.0 ppmvd NOx emission limit is averaged over one hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) one-hour average NOx emissions above 2.0 ppmvd, dry basis at 15 percent O_2, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

A. This equipment operates under any one of the qualified conditions described below:

   1. Rapid combustion turbine load changes due to the following conditions:
      i. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
      ii. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
   2. The first two one-hour reporting periods following the initiation/shutdown of a fogging system injection pump
   3. The first two one-hour reporting periods following the initiation/shutdown of combustion turbine steam injection
   4. The first two one-hour reporting periods following the initiation of HRSG duct burners
   5. Events as the result of technological limitation identified by the operator and approved in writing by the PCAPCD.

B. The 1-hour average NOx emissions above 2.0 ppmv, dry basis at 15 percent O_2, did not occur as a result of operator neglect, improper operation or maintenance, or qualified breakdown under Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance. Notification to the PCAPCD is required within two hours of a qualified event.

C. The qualified operating conditions described in (A) above are recorded in the plant's operating log within 24 hours of the event, and in the CEMS by

5 p.m. the next business day following the qualified operating condition. The notations in the log and CEMS must describe the date and time of entry into the log/CEMS and the plant operating conditions responsible for NOx emissions exceeding the 2.0 ppmv one-hour average limit. In addition, these excursions must be identified in the CEMS quarterly reports.

D. The one-hour average NOx concentration for periods that result from a qualified operating condition does not exceed 25 ppmv, dry basis at 15 percent O_2.

E. All NOx emissions during these events shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit.

Verification: Within 5 working days of the occurrence, the project owner shall submit an Initial Excursion Report to the CPM that includes, but is not limited to: the date, time, duration, cause of the occurrence, the emissions (in total mass and hourly concentration normalized to 15 percent O_2) as a result of the occurrence and the evidence required in element (B) above. The project owner may delay the submittal of copies of the pertinent sections of the CEMS and log book records showing the excursion for no more than 21 working days following the occurrence. The project owner shall include a summary of all excursions as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-54 If the GE LM6000 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

GE LM6000 Combustion Turbine Emission Limitations during Startup and Shutdown		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)
NOx	19.3	49.7
CO	14.3	42.2

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-55 If the Alstom GX100 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

Alstom GX100 Combustion Turbine Emission Limitations during Startup and Shutdown		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)

NOx	37.1	122.8
CO	89.5	204.8

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-56 If the GE LM6000 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown or excursions, shall not exceed the following:

GE LM6000 - COMBUSTION TURBINE EMISSION LIMITATIONS PER TURBINE EXCLUDING STARTUP AND SHUTDOWN	
POLLUTANT	POUNDS/HOUR
Carbon Monoxide (CO)	6.1 (three-hour rolling average)
Nitrogen Oxides (NOx)	5.0 (one-hour average)
PM10	4.6
Sulfur Oxides (SOx)	1.0
Volatile Organic Compounds (VOCs)	1.7

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-57 If the Alstom GX100 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown, or excursions shall not exceed the following:

Alstom GTX100 - COMBUSTION TURBINE EMISSION LIMITATIONS PER TURBINE EXCLUDING STARTUP AND SHUTDOWN	
POLLUTANT	POUNDS/HOUR
Carbon Monoxide (CO)	6.2 (three-hour rolling average)
Nitrogen Oxides (NOx)	5.1 (one-hour average)
PM10	4.7
Sulfur Oxides (SOx)	1.0
Volatile Organic Compounds (VOCs)	1.8

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-58 If the GE LM6000 turbines are selected for the project, the daily emissions shall not exceed the following rates:

GE LM6000 - DAILY EMISSION LIMITS					
POLLUTANT	Two GE Turbines	Auxiliary Boiler	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	268.7	16.8	--	4.31	1.72
CO	300.8	52.8	--	0.84	0.09
VOC	83.6	7.2	--	0.16	0.05
PM10	221.6	14.4	16.3	0.14	0.03
SO_2	46.0	1.92	--	0.10	0.19

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-59 If the Alstom GX100 turbines are selected for the project, the daily emissions shall not exceed the following rates:

Alstom GX100 - FACILITY DAILY EMISSION LIMITS					
POLLUTANT	Two Alstom Turbines	Auxiliary Boiler	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NOx	406.0	16.8	--	4.31	1.72
CO	629.5	52.8	--	0.84	0.09
VOC	223.1	7.2	--	0.16	0.05
PM10	226.8	14.4	16.3	0.14	0.03
SO_2	47.1	1.92	--	0.10	0.19

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-60 If the Alstom GTX100 turbine are selected, the quarterly emissions shall not exceed the levels shown below:

Alstom GTX100 Gas Turbines					
Pollutant	Quarter 1 (lbs/quarter) Two turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/ Year Two Turbines
NOx	15,399	12,965	17,496	15,422	30.64
CO	26,787	32,590	28,175	29,862	58.71
VOCs	5,791	7,306	6,630	6,848	13.29

PM0	16,300	13,692	17,789	17,569	32.67
SOx	3,385	2,843	3,694	3,648	6.78

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-61 If the GE LM6000 turbines are selected are selected, the quarterly emissions shall not exceed the levels shown below:

GE LM6000 Gas Turbines					
Pollutant	Quarter 1 (lbs/quarter) Two Turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two Turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/year Two Turbines
NOx	15,399	12,965	17,496	15,422	30.64
CO	21,291	18,454	23,160	22,982	42.94
VOCs	6,006	5,038	6,555	6,473	12.04
PM10	15,968	13,425	17,410	17,199	32.00
SOx	3,316	2,788	3,615	3,571	6.65

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-62 If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO_x	15,546	13,412	17,646	15,572	31.09
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM10	17,523	15,246	18,999	18,788	35.28
SO_2	3,331	2,838	3,630	3,587	6.69

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-63 If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS					
	QUARTER	QUARTER	QUARTER	QUARTER	Tons/year

POLLUTANT	1 (lbs)	2 (lbs)	3 (lbs)	4 (lbs)	
NOx	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM10	17,854	15,513	19,378	19,158	35.95
SO_2	3,400	2,893	3,709	3,663	6.83

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-64 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines

The gas turbines are required to meet the notification, recordkeeping and performance test requirements of this regulation. The project owner must submit a written quarterly excess emission report to the Administrator. A performance test is required within 60 days of achieving maximum production or no later than 180 days of initial startup.

Verification: The project owner shall include the identification of all excess emissions, PCAPCD notification and corrective actions taken (if any) as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

COOLING TOWERS

Operating Limitations

AQ-65 Project owner shall submit drift eliminator design details for the cooling tower prior to commencement of construction.

Verification: The project owner shall submit drift eliminator design details for the cooling tower at least 30 days prior to commencement of construction.

AQ-66 No hexavalent chromium containing compounds shall be added to the cooling tower makeup water.

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon request from the PCAPCD or CPM.

AQ-67 Cooling tower drift eliminator drift rate shall not exceed 0.0005% of the circulating water flow.

Verification: See the verification of Condition of Certification AQ-65. Project owner shall submit drift eliminator design details for the cooling tower prior to commencement of construction

Performance Testing

AQ-68 A water sample analysis of cooling tower water shall be performed within 180 days of initial operation and annually thereafter.

Verification: The project owner shall submit to the CPM and the PCAPCD the initial and annual cooling tower water sample analysis for approval no later than 60 days following the date of test performance.

Emission Limitations

AQ-69 No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite nuisance complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-70 PM10 emission rate from the cooling tower shall not exceed the following limits:

COOLING TOWER EMISSION LIMITATIONS					
Pollutant	**POUNDS PER DAY**	**QUARTER 1** (Pounds/quarter)	**QUARTER 2** (Pounds/quarter)	**QUARTER 3** (Pounds/quarter)	**QUARTER 4** (Pounds/quarter)
PM10	16.3	1,471	1,487	1,504	1,504

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-71 Compliance with the cooling tower PM10 emission limit shall demonstrated as follows: PM10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emission limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AUXILIARY BOILER

Operating Limitations

AQ-72 An ultra low NOx burner and flue gas recirculation system shall be installed and operated on the auxiliary boiler.

Verification: The project owner shall submit to the CPM no less than one day prior to the cessation of commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or

inspected the identified equipment and certifies that the auxiliary boiler has an operational ultra low NOx burner and flue gas recirculation system.

AQ-73 A non-resetable fuel meter shall be installed on the gas line serving the boiler.

Verification: The project owner shall submit to the CPM no less than one day prior to the cessation of commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the auxiliary boiler has an operational non-resettable fuel meter.

AQ-74 The hours of operation of the auxiliary boiler shall not exceed the following:

Boiler Hours of Operation				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Boiler Hours of Operation	140	568	143	143

Verification: The project owner shall include all necessary operational data to demonstrate compliance with the limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-75 Compliance with the boiler pounds per hour and ppmv emission limits shall be demonstrated by an initial performance test conducted within 60 days of reaching maximum production and not later than 180 days from initial startup.

Verification: The project owner shall submit to the CPM, performance testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the performance test results, no less than 60 days following the actual performance test date.

AQ-76 The initial performance test of the boiler shall be conducted for NOx, VOC, SOx, PM10, CO, CO_2, and O_2.

Verification: The project owner shall submit to the CPM, performance testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the performance test results, no less than 60 days following the actual performance test date.

AQ-77 Performance tests shall be conducted on the boiler every other calendar year after the initial testing. These tests shall include NOx, CO, CO_2, and O_2.

Verification: The project owner shall submit to the CPM, performance testing protocols 30 days prior to the planned test date. The project owner shall submit to the CPM the performance test results, no less than 60 days following the actual performance test date.

AQ-78 All boiler source tests shall be made in the as-found operating condition, except that source tests shall include at least one test conducted at the maximum feasible firing rate allowed by the PCAPCD permit. No source test

shall be conducted within two hours after a continuous period in which fuel flow to the unit is zero, or shut off, for thirty minutes or longer.

Verification: The project owner shall submit to the CPM, source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the source test results, no less than 60 days following the actual source test date.

AQ-79 At least thirty (30) days prior to the compliance source tests, a written test plan detailing the test methods and procedures to be used shall be submitted for approval by the Air Pollution Control Officer and CPM. The plan shall cite the test methods to be used for the determination of compliance with the emission limitations of this rule.

Verification: The project owner shall submit to the CPM, source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the source test results, no less than 60 days following the actual source test date.

AQ-80 A report of the compliance test shall be submitted to the PCAPCD and CPM following completion of the source test.

Verification: The project owner shall submit to the CPM, source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the source test results, no less than 60 days following the actual source test date.

Emission Limitations

AQ-81 The NOx emissions from the boiler shall not exceed 9.0 ppmv @ 3 percent O_2 on a 3 hour average.

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emissions limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-82 The CO emissions from the boiler shall not exceed 50 ppmv @ 3 percent O_2 on a 3 hour average.

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emissions limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-83 The boiler emissions shall not exceed any of the following:

BOILER EMISSION LIMITATIONS

Pollutant	POUNDS Per Hour	QUARTER 1 (Pounds/quarter)	QUARTER 2 (Pounds/quarter)	QUARTER 3 (Pounds/quarter)	QUARTER 4 (Pounds/quarter)
NO_x	0.7	92	372	94	94
CO	2.2	311	1,259	317	317
VOC	0.3	36	144	36	36
PM10	0.6	82	332	84	84
SO_2	0.08	11	46	12	12

Verification: The project owner shall include all necessary emissions data to demonstrate compliance with the emissions limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

DIESEL POWERED IC ENGINES POWERING FIREWATER PUMP

Operating Limitations

AQ-84 Project owner shall submit internal combustion engine (firewater pump) design details to the PCAPCD prior to commencement of construction.

Verification: The project owner shall submit to the CPM and PCAPCD for approval IC engine (firewater pump) design details to the PCAPCD at least 30 days prior to commencement of construction.

AQ-85 A non-resettable hour meter shall be installed on each engine/generator set (firewater pump) to record the hours of operation.

Verification: The project owner shall submit to the CPM no less than one day prior to the cessation of commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the engine/generator set (firewater pump) is equipped with a non-resettable hour meter.

AQ-86 Operation for maintenance and testing of the emergency diesel engine and generator shall be limited to 50 hours per year.

Verification: The project owner shall include all necessary operational data to demonstrate compliance with the limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-87 Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the Air Pollution Control Officer.

Verification: The project owner shall include all necessary operational data to demonstrate compliance with the limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-88 The sulfur content of the diesel fuel used shall not exceed15 ppm by weight.

Verification: The project owner shall include a summary of diesel fuel purchase records showing amounts delivered, date delivered and fuel type with the Quarterly Air Quality Report as required in Condition of Certification AQ-SC6.

Reporting and Recordkeeping

AQ-89 Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:

A. The hours of operation the engine was run for maintenance and testing;

B. The hours of operation the engine was run during interruption of electrical power; and

C. Records of the sulfur content of the diesel fuel used.

Verification: The project owner shall include these records as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

Emission Limitations

AQ-90 No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance.

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite nuisance complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-91 Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions.

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite opacity complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-92 Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO_2 at standard conditions.

Verification: The project owner shall submit to the CPM, source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the source test results, no less than 60 days following the actual source test date.

AQ-93 Sulfur compound emissions calculated as SO_2 shall not exceed 0.2 percent by volume.

Verification: The project owner shall demonstrate compliance with this condition via the data reported for Conditions of Certification AQ-84 and -89.

AQ-94 Nitrogen oxide emissions from the fire pump diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

Verification: The project owner shall submit to the CPM for approval the manufacturer's emissions data sheet or other compelling evidence demonstrating compliance with this condition.

AQ-95 PM-10 emissions from the fire pump diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

Verification: The project owner shall submit to the CPM for approval the manufacturer's emissions data sheet or other compelling evidence demonstrating compliance with this condition.

AQ-96 The fire pump diesel engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

Verification: The project owner shall submit to the CPM for approval a CARB granted certificate or other compelling evidence demonstrating compliance with this condition.

DIESEL IC ENGINE POWERING EMERGENCY GENERATOR

Operating Limitations

AQ-97 Project owner shall submit IC engine design details to the PCAPCD prior to commencement of construction of the IC engine.

Verification: The project owner shall submit to the CPM and PCAPCD for approval IC engine (firewater pump) design details to the PCAPCD at least 30 days prior to commencement of construction.

AQ-98 A non-resettable hour meter shall be installed on each engine/generator set to record the hours of operation.

Verification: The project owner shall submit to the CPM no less than one day prior to commissioning, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the engine/generator is equipped with a non-resettable hour meter.

AQ-99 Operation for maintenance and testing of the emergency diesel engine and generator shall be limited to 50 hours per year.

Verification: The project owner shall include all necessary operational data to demonstrate compliance with the limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-100 Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the Air Pollution Control Officer.

Verification: The project owner shall include all necessary operational data to demonstrate compliance with the limits provided in this Condition as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-101 The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.

Verification: The project owner shall include a summary of diesel fuel purchase records showing amounts delivered, date delivered and fuel type with the Quarterly Air Quality Report as required in Condition of Certification AQ-SC6.

Reporting and Recordkeeping

AQ-102 Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:

A. The hours of operation the engine was run for maintenance and testing.

B. The hours of operation the engine was run during interruption of electrical power.

C. Records of the sulfur content of the diesel fuel used.

Verification: The project owner shall include these records as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

Emission Limitations

AQ-103 No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite nuisance complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-104 Stack emission opacity as dark or darker than Ringelmann No. 1 (20 percent opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)

Verification: The project owner shall report all violations of this condition as noticed by the PCAPCD as well as any offsite opacity complaints as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-105 Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO_2 at standard conditions. (Rule 210)

Verification: The project owner shall submit to the CPM, source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM the source test results, no less than 60 days following the actual source test date.

AQ-106 Sulfur compound emissions calculated as SO_2 shall not exceed 0.2 percent by volume. (Rule 210).

Verification: The project owner shall demonstrate compliance with this condition via the data reported for Conditions of Certification AQ-97 and -102.

AQ-107 Nitrogen oxide emissions from the emergency generator diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

Verification: The project owner shall submit to the CPM for approval the manufacturer's emissions data sheet or other compelling evidence demonstrating compliance with this condition.

AQ-108 PM10 emissions from the emergency generator diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.

Verification: The project owner shall submit to the CPM for approval the manufacturer's emissions data sheet or other compelling evidence demonstrating compliance with this condition.

AQ-109 The engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

Verification: The project owner shall submit to the CPM for approval a CARB granted certificate or other compelling evidence demonstrating compliance with this condition.

PORTABLE EQUIPMENT

AQ-110 Portable equipment shall comply with all applicable requirements while operating at the facility, including PCAPCD Permit and Prohibitory Regulations, or be State-registered portable equipment. State-registered portable equipment shall comply with State registration requirements. A copy of the State registration shall be readily available whenever the State-registered portable equipment is at the facility.

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon request from the PCAPCD or CPM.

TITLE V CONDITION

AQ-111 The Owner/Operator shall file a complete application for a Title V permit pursuant to Rule 507, Federal Operating Permit Program by no later than one year after commencing operation.

Verification: No later than one year after the commencement of operation, the project owner shall submit to the CPM, a copy of the EPA Title V application.

PCAPCD GENERAL CONDITIONS

AQ-112 Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the Air Pollution Control Officer (Rule 501) and the CPM through an amendment of the Conditions of Certification.

Verification: The project owner shall maintain a current and accurate record of the Final Determination of Compliance, the Authority to Construct and Permit to Operate as issued by the PCAPCD, as well as the California Energy Commission Decision. At least

60 days prior to the planned deviation from the approved plans, the project owner shall notify the PCAPCD and the CPM in writing of the planned deviation.

AQ-113 Written notification shall be submitted to the PCAPCD and CPM no later than seven days after completion of construction. (Rule 501)

Verification: The project owner shall submit written notification to the PCAPCD and CPM no later than seven days after completion of construction.

AQ-114 This permit shall be maintained on the premises of the subject equipment.(Rule 501)

Verification: The project owner shall maintain a current and accurate record of the Final Determination of Compliance, the Authority to Construct and Permit to Operate as issued by the PCAPCD, as well as the California Energy Commission Decision and shall make those records available upon request.

AQ-115 The authorized PCAPCD or CEC agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the PCAPCD. (Rule 402)

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon request from the PCAPCD or CPM.

AQ-116 In the event of any violation of the PCAPCD Rules and Regulations, the project owner shall take action to end such violation. (Rule 502)

Verification: The project owner shall report all violations and corrective action taken to the CPM within 30 days of the event.

AQ-117 The project owner shall notify the PCAPCD within two hours of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by PCAPCD Rules and Regulations. (Rule 404)

Verification: The project owner shall report all excess emissions as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-118 Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the PCAPCD and CPM. Such alternations may require an Authority to Construct Permit (Rule 501) and an amendment to the Conditions of Certification

Verification: The project owner shall report all equipment alterations to the PCAPCD and CPM 60 days prior to the alteration.

AQ-119 Exceeding any of the limiting condition is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to PCAPCD Rule 501, General Permit Requirements, Section 400.

Verification: The project owner shall submit all proposed permit modifications to the CPM no less than 60 days prior to the expected exceedance. The project owner shall

report all exceedances to the CPM as part of the Quarterly Air Quality Report required in Condition of Certification AQ-SC6.

AQ-120 In the event of a change of ownership, an application must be submitted to the PCAPCD. Upon any change in control or ownership of facilities constructed, operated, or modified under authority of this permit, the requirements contained in this Authority to Construct shall be binding on all subsequent owners and operators. (Rule 501)

Verification: The project owner shall submit written notification to the CPM of any change in ownership.

AQ-121 Compliance of the permitted facility is required with the provisions of the "Air Toxics 'Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections 44300 et seq.).

Verification: The project owner shall make the power plant site and appropriate records available for inspection upon reasonable notice from the PCAPCD or CPM.

AQ-122 Performance Test Requirements: If the PCAPCD or CPM finds that additional performance tests are required to determine compliance with PCAPCD Rules and Regulations and Conditions of this Authority to Construct, reasonable written notice shall be provided to the project owner. The performance tests shall be subject to the following restrictions (Rule 501):

A. Prior to the actual testing, a written test plan shall be submitted to the Air Pollution Control Officer and CPM detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the Air Pollution Control Officer is required for the use of alternate test methods.

B. The PCAPCD may require, upon reasonable written notice, the conduct by the project owner of such emissions testing or analysis as may be deemed necessary by the PCAPCD to demonstrate compliance with PCAPCD Rules and Regulations and the limiting conditions of this permit.

C. Testing shall be conducted in accordance with 40 CFR 60, Appendix A, Methods, or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by the project owner and approved in writing by the Air Pollution Control Officer. Independent testing contractors and analytical laboratories shall be Air Resources Board certified for the test or analysis conducted. Particulate matter testing, if requested, shall include both filterable and condensed particulate matter (e.g. Method 5 modified to include impinger catch).

D. A report of the testing shall be submitted to the PCAPCD and the CPM after the source test is performed

Verification: The project owner shall submit to the CPM source testing protocols 30 days prior to the planned source test date. The project owner shall submit to the CPM

the results of a source test, regardless of those results, no less than 60 days following the actual source test date.

REFERENCES

California Air Resources Board (CARB 2003), "Ammonia Emission Inventories for San Joaquin Valley and Southern California". September 2003.

CEC 1998. California Energy Commission. 1997 Global Climate Change, Greenhouse Gas Emissions Reduction Strategies for California, Volume 2, Staff Report. 1998.

CEC 2003. California Energy Commission. 2003 Integrated Energy Policy Report. December.

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. Submitted to the Docket on February 6, 2004

Placer County Air Pollution Control District (PCAPCD) 2003a. Preliminary Determination of Compliance. Submitted to the Docket on May 28, 2003.

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

Roseville Electric, Roseville, California (ROSEVILLE) 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

ROSEVILLE 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

Sacramento Regional Research Institute (SRRI 2004), "Placer County Economic and Demographic Profile 2004. January 2004.

Seinfeld, John H. "Atmospheric Chemistry and Physics of Air Pollution" (Seinfeld 1986), Chapter 9.7, 1986.

APPENDIX A – AIR QUALITY MONITORING DATA ASSESSMENT

Air quality monitoring data is used by staff to determine the probably background air quality into which a power plant project may be emitting pollutants. This is done to determine if a power plant project causes or contributes to a violation of any state or federal ambient air quality standards. In term of a cumulative impact, CEQA requires that staff consider past, present and probable future emissions. The background air quality represents the staff estimate of past and present ambient air quality. However, it is not always possible to find ambient air quality monitoring data in the vicinity of the project site. Therefore, staff must evaluate data from several monitoring stations to ensure a reasonable representation of the project site ambient air quality.

Three ambient air quality monitoring stations were chosen by staff and the City of Roseville to be included is the assessment of the background ambient air quality for the REP site. The stations chosen are the North Highlands Station located on Blackfoot way, the Roseville Station located on North Sunrise Boulevard and the Rocklin Station located on Rocklin Road. Each of the three ambient air quality monitoring stations were examined for all pollutants that were monitored (some pollutants were not monitored at some stations). Staff reviewed and analyzed both the historic trends and specific dates to determine the most reasonable representation of background air quality for the Roseville Energy Park site. **APPENDIX A Table 1** summarizes staff's findings and is identical to **AIR QUALITY Table 3**. The source of all ambient air quality monitoring data is taken from the California Air Resources Board.

APPENDIX A Table 1
Staff Recommended Background Pollution Concentrations

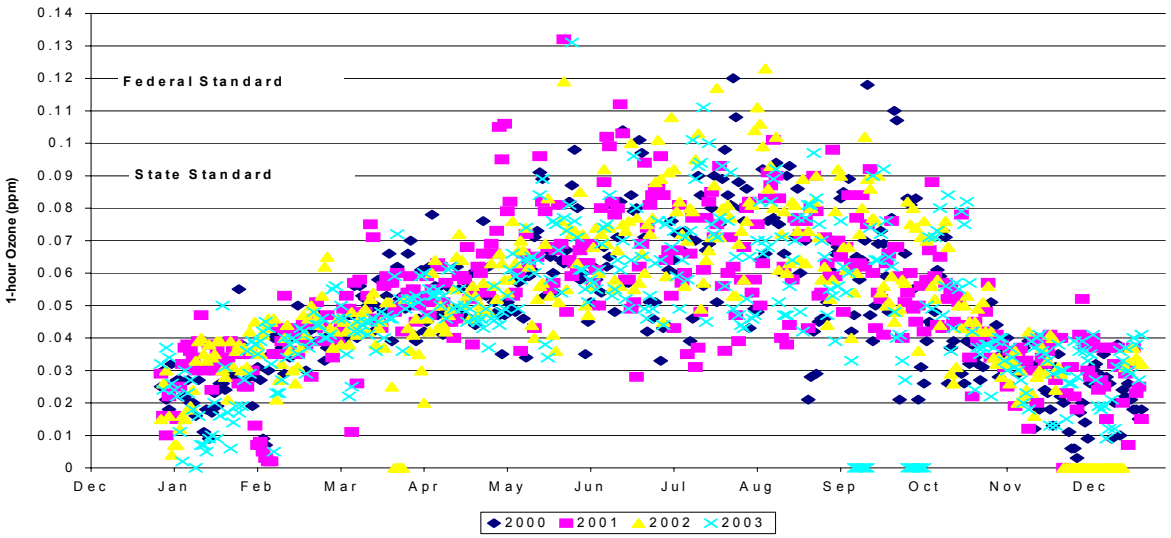
Pollutant	Averaging Time	Measurement ug/m^3	Measurement ppm	Station	Date
Ozone	8-hour	233	0.119	Rocklin	1998
	1-hour	300	0.153	Roseville	1998
PM10	Annual	25.2	--	Roseville	2002
	24-hour	62.0	--	Roseville	2001
PM2.5	Annual	13.4	--	Roseville	1999
	24-hour	53	--	Roseville	2002
CO	8-hour	3,122	2.81	Roseville	2002
	1-hour	5,257	4.6	Roseville	2002
NO2	Annual	30.2	0.016	Roseville	2002
	1-hour	182.4	0.097	Roseville	1998
SO2	Annual	0.05	0.002	North Highlands	2002
	24-hour	28.7	0.011	North Highlands	2001
	3-hour	31.2	0.012	North Highlands	2001
	1-hour	49.8	0.019	North Highlands	2002

Source: California Air Resources Board

OZONE

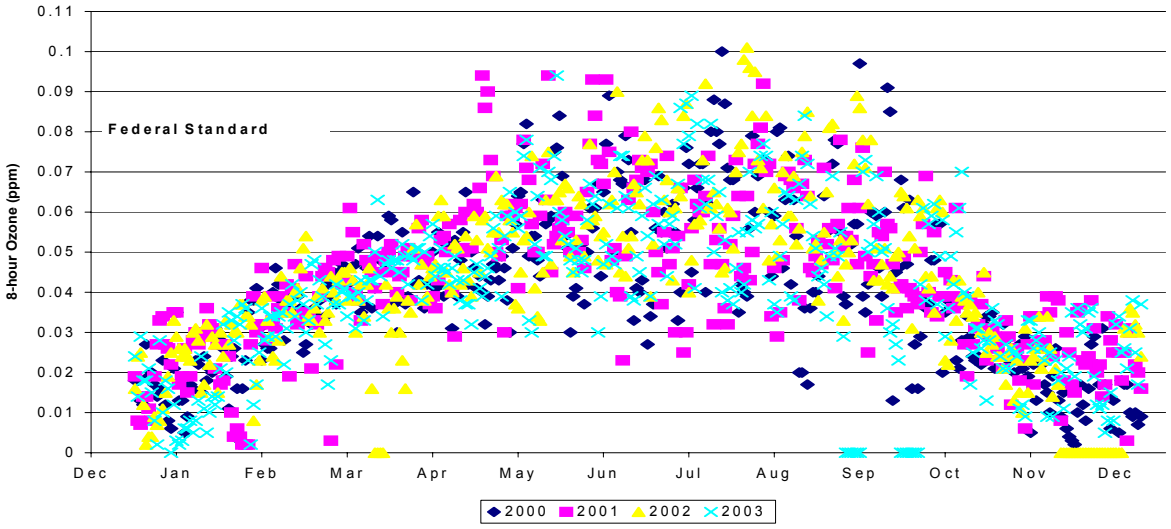
North Highlands Monitoring Station

APPENDIX A Figure 1
Daily Maximum 1-hour Ozone Measurements
North Highlands Monitoring Station

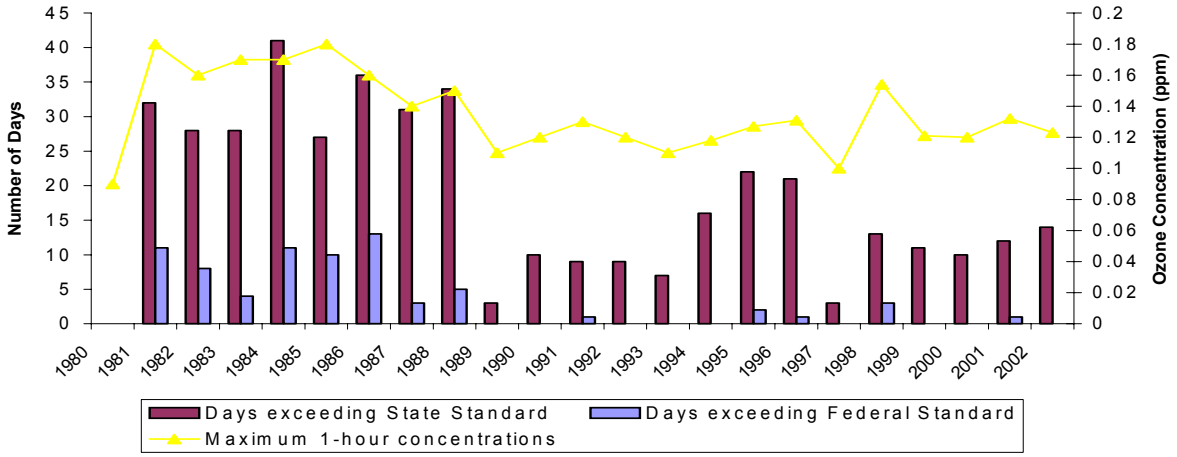


APPENDIX A Figures 1 and **2** both show a clear seasonal trend of ozone formation up wind of the REP site vicinity. As can be seen, from 2000 to 2003, violations of the state and federal **1-hour** ozone ambient air quality standards occur starting in April and lasting into October. As can also be seen the number of violations is reasonably steady from 2000 to 2002 and decreasing in 2003.

APPENDIX A Figure 2
Daily Maximum 8-hour Ozone Measurements
North Highlands Monitoring Station



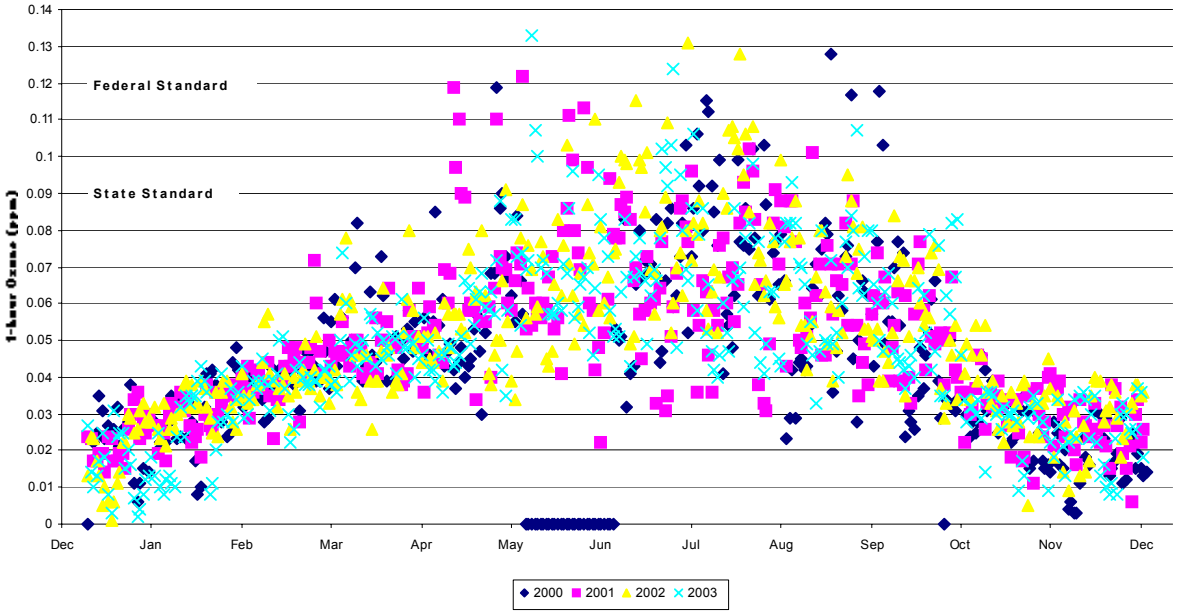
APPENDIX A Figure 3
Maximum Annual 1-hour Ozone Measurements and
Number of Days in Exceedance of Ozone Standards
North Highlands Monitoring Station



Looking further into the historically trends at the North Highlands monitoring station, it can be seen in **APPENDIX A Figure 3** that significant improvements were made from the 1980-1988 time period as compared to 1998 –2002 time period. However, only slight improvements were made from 1998 to 2002 with the highest ozone clearly being recorded in 1998.

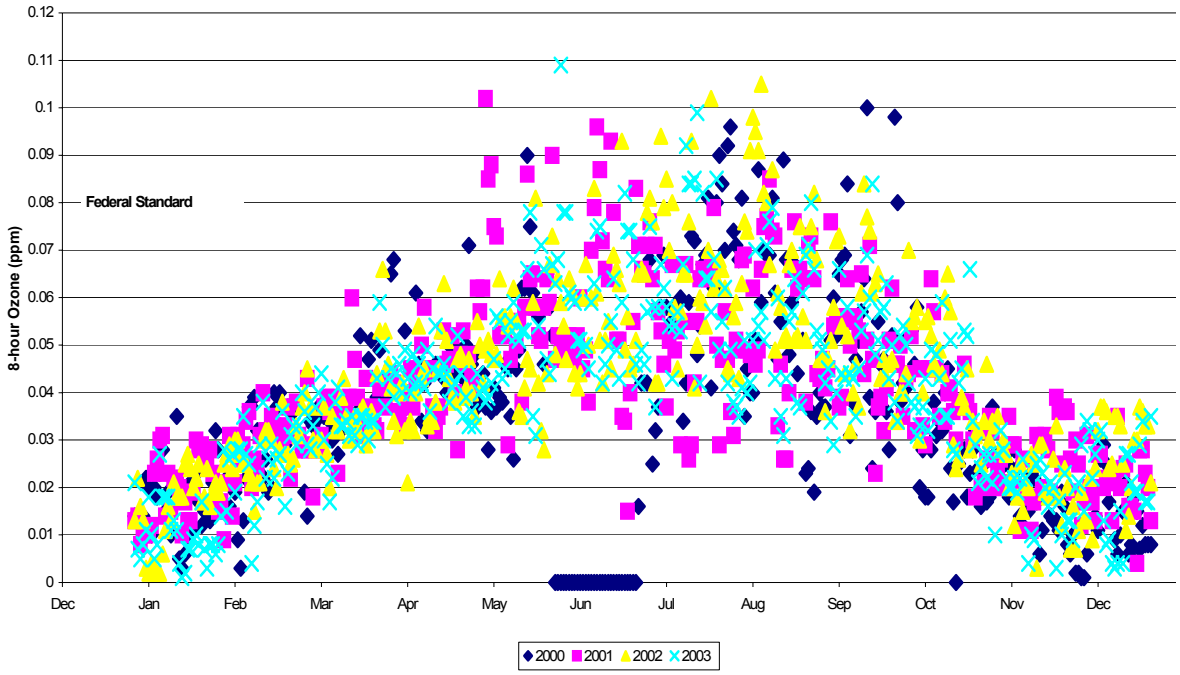
Roseville Monitoring Station

APPENDIX A Figure 4
Daily Maximum 1-hour Ozone Measurements
Roseville Monitoring Station



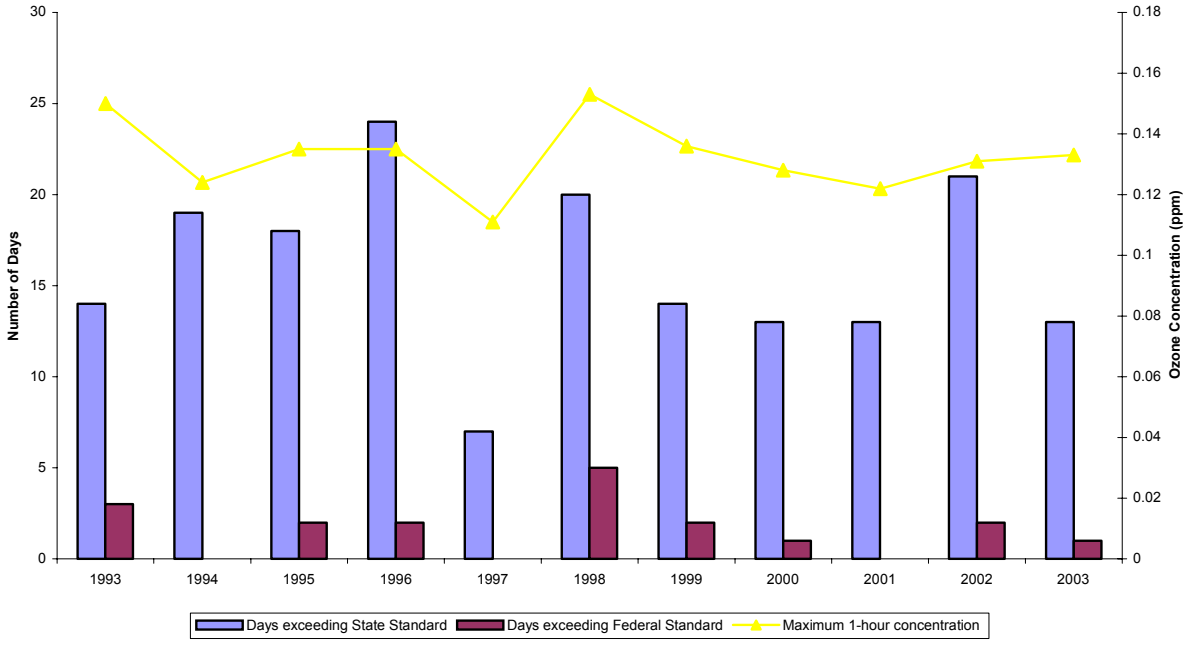
APPENDIX A Figures 4 and **5** both show a clear seasonal trend of ozone formation down wind of the REP site vicinity. As is the case for the North Highlands monitoring station, from 2000 to 2003, violations of the state and federal **1-hour** ozone ambient air quality standards occur starting in April and lasting into October. However, the same decrease in violations is not apparent in the Roseville monitoring data.

APPENDIX A Figure 5
Daily Maximum 8-hour Ozone Measurements
Roseville Monitoring Station



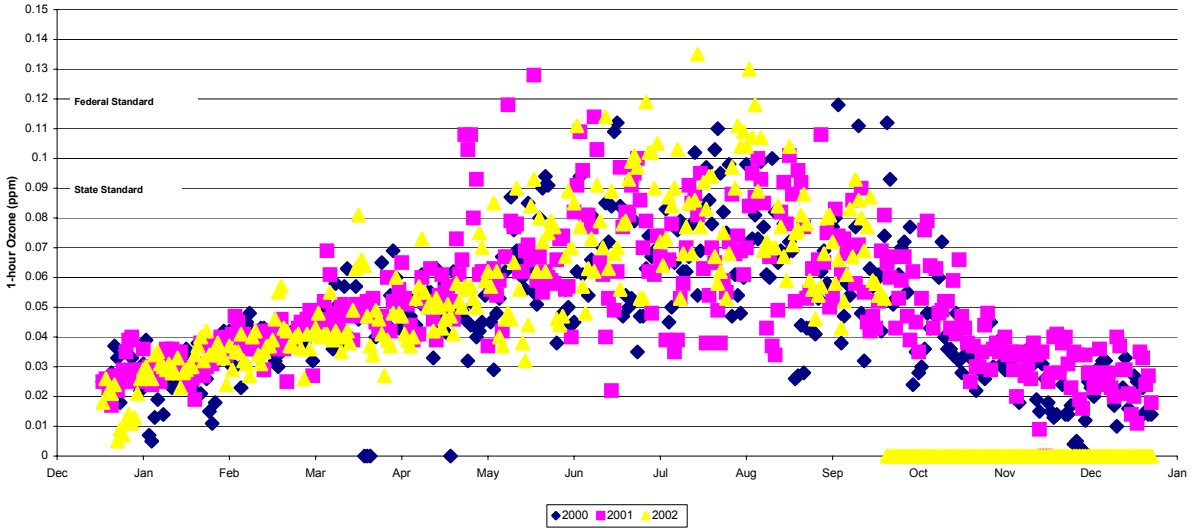
The available historic data at the Roseville Monitoring Station is from1993 to present. As can be seen in **APPENDIX A Figure 6**, there seems to be little on trend toward improvements at this monitoring station. The maximum **1-hour** ozone measurement at the Roseville Monitoring Station was made in 1998.

APPENDIX A Figure 6
Maximum Annual 1-hour Ozone Measurements and
Number of Days in Exceedance of Ozone Standards
Roseville Monitoring Station



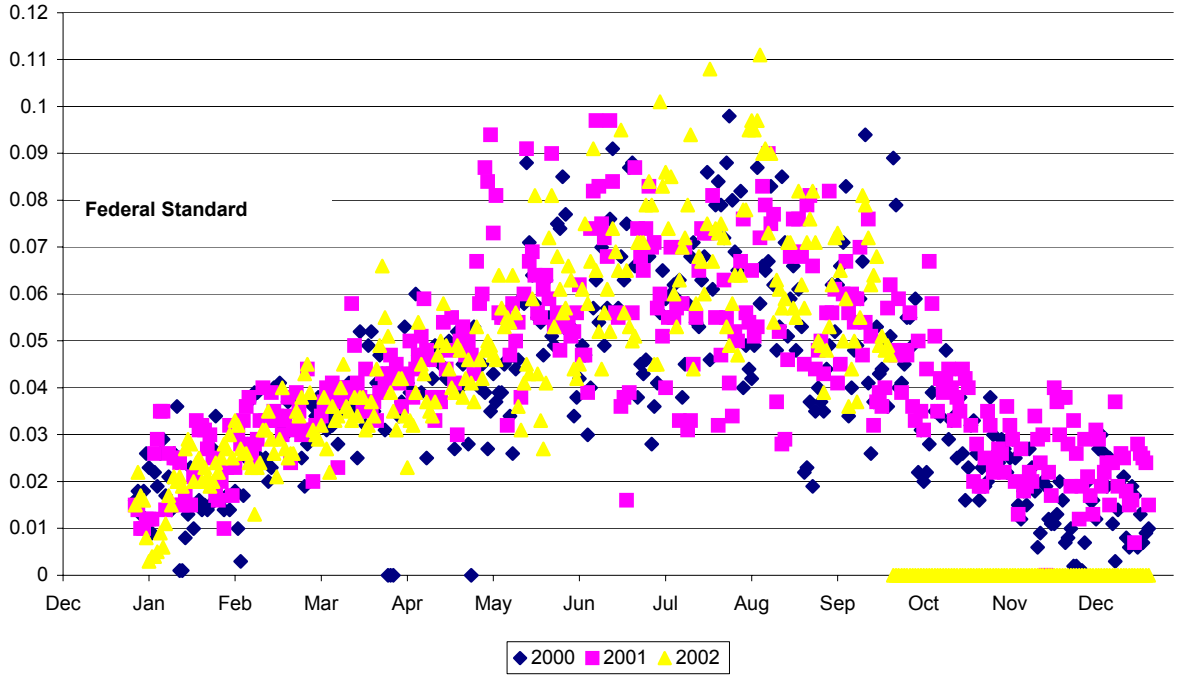
Rocklin Monitoring Station

APPENDIX A Figure 7
Daily Maximum 8-hour Ozone Measurements
Roseville Monitoring Station



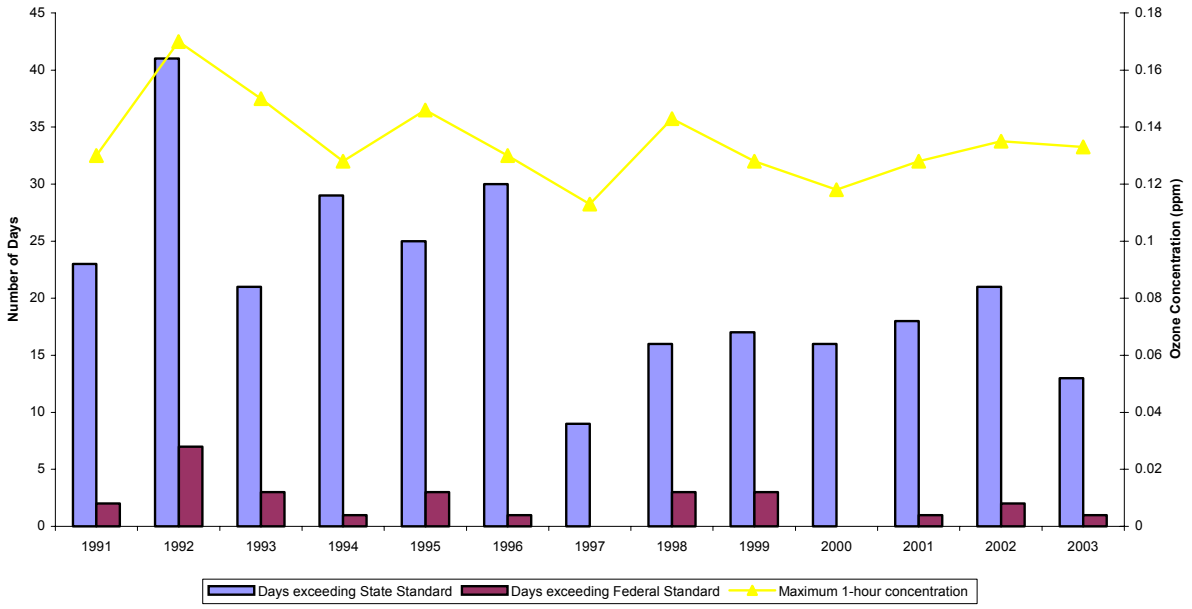
APPENDIX A Figures 7 and **8** both show a clear seasonal trend of ozone formation down wind of the REP site vicinity. As is the case for the North Highlands and Roseville monitoring station, from 2000 to 2002 (2003 data was not available), violations of the state and federal **1-hour** ozone ambient air quality standards occur starting in April and lasting into October. As is the case with the Roseville Monitoring Station data, there seems to be little improvement in ozone violations from 2000 to 2002.

APPENDIX A Figure 8
Daily Maximum 8-hour Ozone Measurements
Roseville Monitoring Station



The available historic data at the Rocklin Monitoring Station is from1991 to present. As can be seen in **APPENDIX A Figure 9**, there seems to be a trend toward improvement from the 1991-1996 tine frame to the 1997-2003 time frame at this monitoring station. The maximum **1-hour** ozone measurement at the Roseville Monitoring Station was made in 1998.

APPENDIX A Figure 9
Maximum Annual 1-hour Ozone Measurements and
Number of Days in Exceedance of Ozone Standards
Roseville Monitoring Station



In staff's opinion the seasonal and historic annual ozone data from the three monitoring stations considered correlate well and will tend to give a reasonable estimate of the ozone ambient air quality into which the REP project will emit pollutants. The highest **8-hour** ozone concentration was recorded in Rocklin in 1998 and the highest **1-hour** ozone concentration was measured in Roseville in 1998. It is staff's opinion, given the apparent lack of significant progress (some progress has been made) from 1998 to 2003, that the Rocklin and Roseville measurements represent a reasonably conservative estimate of the background **8-hour** and **1-hour** ozone ambient air quality respectively.

PM10 AND PM2.5

PM10 and PM2.5 are monitored based on a six-day average thus graphs similar to the ozone graphs presented above can not be created. The Placer County Air Quality Management District is currently in attainment for the federal PM10 ambient air quality standards, but in non-attainment for the state PM10 ambient air quality standards. Thus **APPENDIX A Table 2** show only the days in violation for the state PM10 ambient air quality standards. The days-in-violation is a calculation, which simple thought of is multiplying the number of violations recorded by the average number days (typically 6) over which the recordings were made. Thus the days-in-violations is actually the estimated days-in-violation, that is also way this is often a decimal number and not an integer.

APPENDIX A Table 2
Days of Violation of the State PM10 24-hour Ambient Air Quality Standard

	North Highlands	Roseville	Rocklin
2003	--	6.1	not available
2002	--	6.1	--
2001	--	23.8	12
2000	12.6	11.4	0
1999	--	24.5	30.5
1998	--	17.6	5.8
1997	--	0	0
1996	24.4	0	0
1995	--	7.4	3.7
1994	--	16.0	4.0

The dash marks in **APPENDIX A Table 2** represent years in which there was not enough consistent monitoring data to make a reasonable calculation. Thus North Highlands only recorded two years of data that could be used to calculate the number of days in exceedance of the PM10 **24-hour** state ambient air quality standard. The Roseville data shows the most consistent monitoring, thus in staff's opinion the Roseville Monitoring Station should be deferred to for the description of the background PM10 ambient air quality (both **annual** and **24-hour**).

APPENDIX A Table 3 shows the historic annual average and maximum **24-hour** measurements of PM10 at the Roseville Monitoring Station. Comparing the 2000-2003 time frame with the 1994-1999 time frame, a reasonably clear division in maximum annual 24-hour measurements is evident and appears to be consistently decreasing. Therefore, it is staff's opinion that the most reasonable representation of the REP site PM10 ambient air quality is that taken from the Roseville Monitoring Station between 2000 and 2003. For **annual** average PM10 this would be 25.2 ug/m^3 recorded in 2002, and for the **24-hour** average PM10 this would be 62.0 ug/m^3 recorded in 2001.

APPENDIX A Table 3
Annual Average and Maximum Recorded 24-hour PM10 Measurements
Roseville Monitoring Station (ug/m^3)

	Annual Average	Highest Annual 24-hour
2003	21.3	59.0
2002	25.2	61.0
2001	24.7	62.0
2000	24.5	62.0
1999	26.7	89.0
1998	23.0	72.0
1997	22.1	50.0
1996	20.9	39.0
1995	24.1	61.0
1994	25.3	65.0

Of the three monitoring stations considered, the Roseville Monitoring Station is the only one that monitored PM2.5 ambient air quality. From the available data shown in **APPENDIX A Table 4**, staff recommends that the **annual** average PM2.5 background that would most reasonably represent the REP site is 13.4 recorded in 1999. However, it is staff's opinion that the maximum annual **24-hour** average measurement of 79.0 ug/m^3 recorded in 1999 is not representative of the REP site, as other years recorded values that are 40% to 80% of the 1999 value. Staff recommends the 2002 recording of 53.0 ug/m^3 as a conservative representation of the REP site PM2.5 **annual** ambient air quality.

APPENDIX A Table 4
Annual Average and Maximum Recorded 24-hour PM2.5 Measurements
Roseville Monitoring Station (ug/m^3)

	Annual Average	Highest Annual 24-hour
2003	not available	30.0
2002	13.2	53.0
2001	11.9	49.0
2000	12.2	51.0
1999	13.4	79.0
1998	not available	63.0

OXIDES OF CARBON, NITROGEN AND SULFUR

The District is in attainment of the carbon monoxide (CO), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) federal and state ambient air quality standards. Unlike the situation for ozone and PM10/PM2.5, the background air quality does not exceed the federal or state ambient air quality standards.

Ambient air CO concentrations were measured at the North Highlands and Roseville stations and are shown in **APPENDIX A Table 5**. The historic data show very low CO measurements and demonstrate no clear trend. Staff recommends the 2002 Roseville data to represent the **1-hour** and **8-hour** CO ambient air quality for the REP site because Roseville is the closer monitoring station to the REP site.

APPENDIX A Table 5
Annual Maximum Recorded 1-hour and 8-hour CO Measurements
North Highlands and Roseville Monitoring Station (ppm)

	North Highlands		Roseville	
	Maximum 1-hour	Maximum 8-hour	Maximum 1-hour	Maximum 8-hour
2003	3.2	2.1	2.4	1.6
2002	3.7	3.1	4.6	2.8
2001	4.4	3.1	3.1	1.9
2000	4.1	3.1	3.2	2.4

NO_2 ambient air concentration measurements where taken at the North Highlands and Roseville monitoring station, which are upwind and downwind respectively. The

maximum **1-hour** concentrations and annual average concentrations measured are shown in **APPENDIX A Table 6**. As can been seen, there is not a significant difference between the upwind (North Highlands) and downwind (Roseville) monitoring measurements made for NO_2. Furthermore, it is clear that there is little or no trend in the monitoring data for NO_2, at either the North Highlands or Roseville stations. This leads staff to recommend that the maximum **1-hour** NO_2 background concentration for the REP site be represented by the 1998 Roseville measurement, as it is the highest measure and Roseville is the closer of the two monitoring stations. Staff also recommends the 2002 measurement at the Roseville station for the **annual** average NO_2 background for the REP site as it is the highest measurement and most recent (it is identical to the 1998 measurement).

APPENDIX A Table 6
Annual Average and Maximum Recorded 1-hour NO_2 Measurements
North Highlands and Roseville Monitoring Station (ppm)

	North Highlands		Roseville	
	Maximum Hourly	**Annual Average**	**Maximum Hourly**	**Annual Average**
2003	0.087	0.015	0.083	0.014
2002	0.067	0.015	0.075	0.016
2001	0.075	0.014	0.086	0.015
2000	0.085	0.014	0.082	0.016
1999	0.070	0.014	0.093	0.012
1998	0.101	0.014	0.097	0.016
1997	0.067	0.013	0.080	0.015
1996	0.074	0.014	0.100	0.016
1995	0.079	insufficient monitoring	0.093	0.017

Ambient air SO_2 concentrations were measured at the North Highlands station and are shown in **APPENDIX A Table 7**. The historic data show very low SO_2 measurements and demonstrate no clear trend. Staff recommends 2002 measurements to represent the REP site **1-hour** and **annual** average SO_2 ambient air quality and the 2001 measurements for the **3-hour** and **24-hour** SO_2 ambient air quality.

APPENDIX A Table 7
Annual Average and Maximum Recorded 1, 3 and 24-hour SO_2 Measurements
North Highlands Monitoring Station (ppm)

	Maximum 1-hour	Maximum 3-hour	Maximum 24-hour	Annual Average
2003	0.008	NA	0.006	0.001
2002	0.019	0.011	0.009	0.002
2001	0.014	0.012	0.011	0.002
2000	0.013	0.008	0.005	0.002

APPENDIX B – ESTIMATED PLACER COUNTY AMMONIA INVENTORY

PM10/PM2.5 can be formed downwind from an emission source as a secondary emission (similar to ozone) from a reaction between ammonia and airborne acids. The most dominant reactions are between SOx emissions (as sulfuric acid, H_2SO_4) and NOx emissions (as nitric acid, HNO_3). The complexity of these reactions arises from the formation of gaseous, liquid and solid forms of the products and reactants involved. The qualitative understanding of these reactions indicates that all the available ammonia will be reacted with all the available sulfuric acid prior to any ammonia being reacted with any available nitric acid (Seinfeld 1986). From this presumption, two cases of interest arise. The sulfate rich case (or ammonia limited), where the molar ratio of ammonia (NH_3) to sulfate (SO_4) is less than two, so that there is insufficient ammonia to react with the sulfate. The ammonia rich case, where the molar ratio of ammonia to sulfate is greater than two, so that the sulfate is completely reacted and there is excess ammonia (Seinfeld 1986).

For the purpose of determining the secondary PM10/PM2.5 potential impacts, it is necessary to determine first, if the area is either ammonia rich or ammonia limited as discussed above, and second, to determine what additional ammonium sulfate and ammonium nitrate are likely to form. Lastly, those impacts must be compared to the existing background measurements. Unfortunately, no information is available to complete any of these steps. What can be done is to determine if the potential exists for ammonia, SOx and NOx emissions from the proposed REP facility to contribute to an existing violation of the PM10 or PM2.5 state ambient air quality standards.

There is no ammonia inventory data available for Placer County. However, from ammonia inventories of other counties and air districts (as well as the state inventory), it is clear that such inventories are dominated by livestock (45 percent statewide), on-road mobile (19 percent statewide) and composting, fertilizers, and other agricultural sources (19 percent statewide). Currently, there are two ammonia inventories available from CARB in addition to the state inventory: San Joaquin Valley Air Pollution Control District (2000) and South Coast Air Quality Management District (2000). Staff has modified the San Joaquin inventory slightly such that, in staff's opinion, the resulting inventory is a reasonable estimate of what the Placer County ammonia inventory might be. **APPENDIX B Table 1** compares the inventories of the San Joaquin Valley and South Coast air basins. It can be seen is that the San Joaquin Valley is agriculturally dominated while the South Coast is industrially dominated. It is staff's impression that the Placer County inventory would most likely be some where between these two extremes, but somewhat closer to San Joaquin than South Coast.

APPENDIX B Table 1
Comparison of San Joaquin Valley and South Coast Ammonia Inventories

	San Joaquin Valley		South Coast	
	Ammonia (tons/day)	**% of total Inventory**	**Ammonia (tons/day)**	**% of total Inventory**
Burning Residential, Ag. and Timber	1.52	0.4%	NA	--
Landfill and Composting	17.33	4.7%	9.8	5.4%
Domestic	5.05	1.4%	24.6	13.5%
Fertilizer Applications	15.26	4.1%	6.1	3.4%
Livestock	308.78	83.7%	60.4	33.2%
Motor Vehicles	5.13	1.4%	33.3	18.4%
Native Animals	1.40	0.4%	0.17	0.1%
Industrial Sources	0.58	0.2%	13.2	7.3%
Soil - Natural & Ag.	13.70	3.7%	34.2	18.8%
Total	**368.74**		**181.7**	

Less than one percent of employees in Placer County are engaged in the Agricultural sector while Trade, Transportation, & Utilities sector makes up close to 20 percent of the county's total employment in 2002 (SRRI 2004). Therefore, it is reasonable to assume that the Placer County ammonia inventory (if one existed) would not have significant contributions from livestock or agricultural sources. That leaves on-road mobile sources as the only major contributor to a Placer County ammonia inventory. Staff eliminated the majority of the livestock, composting and fertilizer contributions from the San Joaquin Valley ammonia inventory so that it could be used as a proxy to more closely reflect the expectations of a Placer County ammonia inventory.

In **APPENDIX B Table 2**, Staff eliminated the majority of the livestock, composting and fertilizer contributions from the San Joaquin Valley ammonia inventory so that it could be used as a proxy to more closely reflect the expectations of a Placer County ammonia inventory. Specifically, staff has eliminated the ammonia sources of composting, fertilizer, beef cattle, dairy cattle, and poultry. Since these sources are primarily a function of the farming, cattle and poultry industries and such industries are assumed to be not significant in the Placer County area. Thus, staff estimates the ammonia inventory to be approximately 36 tons/day.

APPENDIX B Table 2
Staff Modification of San Joaquin Valley Ammonia Inventory
to Estimate Placer County Ammonia Inventory

	San Joaquin Valley		Estimated Placer County	
	Ammonia (tons/day)	**% of total Inventory**	**Ammonia (tons/day)**	**% of total Inventory**
Burning Residential, Ag. and Timber	1.52	0.4%	1.52	4.2%
Landfill and Composting	17.33	4.7%	2.51[a]	7.0%
Domestic	5.05	1.4%	5.05	14.0%
Fertilizer Applications	15.26	4.1%	0	0%
Livestock	308.78	83.7%	6.05[b]	16.8%
Motor Vehicles	5.13	1.4%	5.13	14.3%
Native Animals	1.40	0.4%	1.40	3.9%
Industrial Sources	0.58	0.2%	0.58	1.6%
Soil - Natural & Ag.	13.70	3.7%	13.70	38.2%
Total	**368.74**		**35.9**	

Notes:
[a] Includes Landfill sources only, no major composting.
[b] Includes only the "other" category of livestock, non-beef, non-dairy and non-poultry.

In comparison to the ammonia rich areas of San Joaquin Valley (368.7 tons/day) and the South Coast (181.7 tons/day), the estimated ammonia inventory of Placer County (36 tons/day) leads staff to presume that the area is most likely ammonia limited. Thus, as discussed above, it is likely that the release of further ammonia would lead to further PM10/PM2.5 formation downwind. However, it is not possible to determine the rate at which this could occur with the available information. Therefore, staff concludes that the release of ammonia slip from the REP facility has a high likelihood of forming additional PM10/PM2.5 downwind and thus contributing to an existing violation of the PM10 or PM2.5 state ambient air quality standards.

APPENDIX C – EMISSION CALCULATIONS

LM6000 EMISSION CALCULATIONS – ORIGINAL PROPOSAL

Emission Assumptions						
	Peak Load (Lbs/hr)			Base Load (Lbs/hr)		
NOx	4.99354			3.40784		
CO	6.08073			4.1496		
ROC	1.74166			1.18789		
PM10	4.61679			3.16563		
SO2	0.9591			0.65717		
NH3	9.2			6.3		
Operation Assumptions						
	Quarters					
	1	2	3	4	Annual	
Base load Operation per Turbine	1,123	1,188	751	852	3,914	
Peak Load Operation per Turbine/HRSG	929	559	1,347	1,246	4,081	
Hot Starts (number)	25	71	29	42	167	
Warm Starts (number)	8	20	1	1	30	
Cold Starts (number)	1	2	1	1	5	
Startup and Shutdown per Turbine (hours)	44	117	34	47	242	
Total Hours of Operation per Turbine	2096	1864	2132	2145	8237	
Auxiliary Boiler	140	568	143	143	995	
Emergency Generator	12.5	12.5	12.5	12.5	50	
Firewater Pump	12.5	12.5	12.5	12.5	50	
Cooling Tower	2160	2184	2208	2208	8760	
Estimated Quaterly Emissions						
	Quarters (lbs)					
Base load Operation	1	2	3	4	Annual	
NOx	7,654	8,098	5,118	5,806	26676	
CO	9,320	9,860	6,232	7,070	32482	
ROC	2,668	2,822	1,784	2,024	9298	
PM10	7,110	7,522	4,754	5,394	24780	
SO2	1,476	1,562	988	1,120	5146	
NH3	14,150	14,968	9,462	10,736	49316	
					147698	

	Quarters (lbs)					
Peak Load Operation	1	2	3	4	Annual	
NOx	9,278	5,582	13,452	12,444	40756	
CO	11,298	6,798	16,382	15,154	49632	
ROC	3,236	1,948	4,692	4,340	14216	
PM10	8,578	5,162	12,438	11,506	37684	
SO2	1,782	1,072	2,584	2,390	7828	
NH3	17,094	10,286	24,784	22,926	75090	
Hot Starts						
NOx	398	1129	461	668	2656	
CO	408	1157	473	685	2723	
ROC	58	163	67	97	385	
PM10	158	447	183	265	1053	
SO2	33	92	38	55	218	
Warm Starts						
NOx	234	584	29	29	876	
CO	221	552	28	28	829	
ROC	36	90	5	5	136	
PM10	102	254	13	13	382	
SO2	21	52	3	3	79	
Cold Starts						
NOx	50	99	50	50	249	
CO	42	84	42	42	210	
ROC	7	13	7	7	34	
PM10	19	38	19	19	95	
SO2	4	8	4	4	20	
Total for Startups						
NOx	682	1812	540	747	3781	
CO	671	1793	543	755	3762	
ROC	101	266	79	109	555	
PM10	279	739	215	297	1530	
SO2	58	152	45	62	317	
Turbine Total						
NOx	17,614	15,492	19,110	18,997	71,213	35.6065
CO	21,289	18,451	23,157	22,979	85,876	42.938
ROC	6,005	5,036	6,555	6,473	24,069	12.0345
PM10	15,967	13,423	17,407	17,197	63,994	31.997
SO2	3,316	2,786	3,617	3,572	13,291	6.6455
Boiler						
NOx	95	386	97	97	675	
CO	321	1,301	327	327	2276	
ROC	43	176	44	44	307	
PM10	81	329	83	83	576	
SO2	11	45	11	11	78	

	Quarters (lbs)					
Generator	1	2	3	4	Annual	
NOx	54	54	54	54	216	
CO	11	11	11	11	44	
ROC	2	2	2	2	8	
PM10	2	2	2	2	8	
SO2	1	1	1	1	4	
Fire Pump						
NOx	43	43	43	43	172	
CO	2	2	2	2	8	
ROC	1	1	1	1	4	
PM10	1	1	1	1	4	
SO2	5	5	5	5	20	
Cooling Tower						
NOx	0	0	0	0	0	
CO	0	0	0	0	0	
ROC	0	0	0	0	0	
PM10	1,471	1,487	1,504	1,504	5966	
SO2	0	0	0	0	0	
Facility Total						
NOx	17,806	15,975	19,304	19,191	72276	36.138
CO	21,623	19,765	23,497	23,319	88204	44.102
ROC	6,051	5,215	6,602	6,520	24388	12.194
PM10	17,522	15,242	18,997	18,787	70548	35.274
SO2	3,333	2,837	3,634	3,589	13393	6.6965

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	8.8	12.2	19.3	15.9	29.2	49.7
CO	9.2	10.8	14.3	16.3	27.6	42.2
ROC	1.4	1.4	1.4	2.3	4.5	6.6
PM10	3.2	3.2	3.2	6.3	12.7	19
SO2	0.7	0.7	0.7	1.3	2.6	3.9
Duration (hours)	1	2	3			
Lbs/hr	Boiler	Pump	Generator	Cooling Tower		
NOx	0.68	3.44	4.31	0		
CO	2.29	0.18	0.84	0		
ROC	0.31	0.1	0.16	0		
PM10	0.58	0.06	0.14	0.681		
SO2	0.08	0.38	0.1	0		

GE LM6000 TURBINES – 31.1 TON/YEAR NOX LIMIT

These calculations apply only to the NOx emissions.

Emission Assumptions					
	Peak Load (Lbs/hr)			Base Load (Lbs/hr)	
NOx	4.99354			3.40784	
CO	6.08073			4.1496	
VOC	1.74166			1.18789	
PM10	4.61679			3.16563	
SO2	0.9591			0.65717	
NH3	9.2			6.3	

Operation Assumptions					
	Quarters (hours)				
	1	2	3	4	Annual (hours)
Base load Operation per Turbine	1,324	1,094	1247	1298	4,963
Peak Load Operation per Turbine/HRSG	500	321	849	509	2,179
Hot Starts (number)	14	31	23	19	87
Warm Starts (number)	33.0	39.0	2.0	24.0	98.0
Cold Starts (number)	3.0	13.0	1.0	9.0	26.0
Startup and Shutdown per Turbine (hours)	89.0	148.0	30.0	94.0	361.0
Total Hours of Operation per Turbine	1,913	1,563	2,126	1,901	7,503
Auxiliary Boiler	140	568	143	144	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Firewater Pump	12.5	12.5	12.5	12.5	50
Cooling Tower	2160	2184	2208	2208	8760
Turbine Offline	247	621	82	307	1,257
Operating Turbines	2				

Estimated Quarterly Emissions

	Quarters (lbs)				
Base load Operation	1	2	3	4	Annual (lbs)
NOx	**9,024**	**7,456**	**8,500**	**8,846**	**33826**
CO	10,988	9,080	10,350	10,772	41190
VOC	3,146	2,600	2,962	3,084	11792
PM10	8,382	6,926	7,896	8,218	31422
SO2	1,740	1,438	1,638	1,706	6522
NH3	16,682	13,784	15,712	16,354	62532

	Quarters (lbs)				
Peak Load Operation	1	2	3	4	Annual (lbs)
NOx	**4,994**	**3,206**	**8,480**	**5,084**	**21764**
CO	6,080	3,904	10,326	6,190	26500
VOC	1,742	1,118	2,958	1,774	7592
PM10	4,616	2,964	7,840	4,700	20120
SO2	960	616	1,628	976	4180
NH3	9,200	5,906	15,622	9,366	40094

	Quarters (lbs)				
Hot Starts	1	2	3	4	Annual (lbs)
NOx	**223**	**493**	**366**	**302**	**1384**
CO	228	505	375	310	1418
VOC	32	71	53	44	200
PM10	88	195	145	120	548
SO2	18	40	30	25	113

	Quarters (lbs)				
Warm Starts	1	2	3	4	Annual (lbs)
NOx	**964**	**1139**	**58**	**701**	**2862**
CO	911	1076	55	662	2704
VOC	149	176	9	108	442
PM10	419	495	25	305	1244
SO2	86	101	5	62	254

	Quarters (lbs)				
Cold Starts	1	2	3	4	Annual (lbs)
NOx	**149**	**646**	**50**	**447**	**1292**
CO	127	549	42	380	1098
VOC	20	86	7	59	172
PM10	57	247	19	171	494

SO2	12	51	4	35	102

	Quarters (lbs)				
Total for Startups	1	2	3	4	Annual (lbs)
NOx	**1336**	**2278**	**474**	**1450**	**5538**
CO	1266	2130	472	1352	5220
VOC	201	333	69	211	814
PM10	564	937	189	596	2286
SO2	116	192	39	122	469

	Quarters (lbs)				
Turbine Total	1	2	3	4	Annual (lbs)
NOx	**15,354**	**12,940**	**17,454**	**15,380**	**61,128**
CO	18,334	15,114	21,148	18,314	72,910
VOC	5,089	4,051	5,989	5,069	20,198
PM10	13,562	10,827	15,925	13,514	53,828
SO2	2,816	2,246	3,305	2,804	11,171

	Quarters (lbs)				
Boiler	1	2	3	4	Annual (lbs)
NOx	95	386	97	98	676
CO	321	1,301	327	330	2279
VOC	43	176	44	45	308
PM10	81	329	83	84	577
SO2	11	45	11	12	79

	Quarters (lbs)				
Generator	1	2	3	4	Annual (lbs)
NOx	54	54	54	54	216
CO	11	11	11	11	44
VOC	2	2	2	2	8
PM10	2	2	2	2	8
SO2	1	1	1	1	4

	Quarters (lbs)				
Fire Pump	1	2	3	4	Annual (lbs)
NOx	43	43	43	43	172
CO	2	2	2	2	8
VOC	1	1	1	1	4
PM10	1	1	1	1	4
SO2	5	5	5	5	20

	Quarters (lbs)				
Cooling Tower	1	2	3	4	Annual (lbs)
NOx	0	0	0	0	0
CO	0	0	0	0	0
VOC	0	0	0	0	0
PM10	1,471	1,487	1,504	1,504	5966
SO2	0	0	0	0	0

	Quarters (lbs)				Annual	
Facility Total	1	2	3	4	(lbs)	(tons)
NOx	**15,546**	**13,423**	**17,648**	**15,575**	**62192**	**31.096**
CO	18,668	16,428	21,488	18,657	75241	37.6205
VOC	5,135	4,230	6,036	5,117	20518	10.259
PM10	15,117	12,646	17,515	15,105	60383	30.1915
SO2	2,833	2,297	3,322	2,822	11274	5.637

Startup Assumptions

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	8.8	12.2	19.3	15.9	29.2	49.7
CO	9.2	10.8	14.3	16.3	27.6	42.2
VOC	1.4	1.4	1.4	2.3	4.5	6.6
PM10	3.2	3.2	3.2	6.3	12.7	19
SO2	0.7	0.7	0.7	1.3	2.6	3.9
Duration (hours)	1	2	3			

Other Source Assumptions

	Boiler	Pump	Generator	Cooling Tower
NOx	0.68	3.44	4.31	0
CO	2.29	0.18	0.84	0
VOC	0.31	0.1	0.16	0
PM10	0.58	0.06	0.14	0.681
SO2	0.08	0.38	0.1	0

LM6000 TURBINES – 23.4 TON/YEAR NOX LIMIT

These calculations apply only to the NOx emissions.

Emission Assumptions					
	Peak Load (Lbs/hr)			Base Load (Lbs/hr)	
NOx	4.99354			3.40784	
CO	6.08073			4.1496	
VOC	1.74166			1.18789	
PM10	4.61679			3.16563	
SO2	0.9591			0.65717	
NH3	9.2			6.3	
Operation Assumptions					
	Quarters (hours)				
	1	2	3	4	Annual (hours)
Base load Operation per Turbine	1,304	761	1240	1238	4,543
Peak Load Operation per Turbine/HRSG	183	13	563	166	925
Hot Starts (number)	14	31	23	19	87
Warm Starts (number)	2	24	33	39	98
Cold Starts (number)	3	9	1	13	26
Startup and Shutdown per Turbine (hours)	27	106	92	136	361
Total Hours of Operation per Turbine	1,514	880	1,895	1,540	5,829
Auxiliary Boiler	140	568	143	143	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Firewater Pump	12.5	12.5	12.5	12.5	50
Cooling Tower	2160	2184	2208	2208	8760
Turbine Offline	646	1,304	313	668	2,931
Operating Turbines	2				

Estimated Quarterly Emissions

	Quarters (lbs)				
Base load Operation	1	2	3	4	Annual (lbs)
NOx	8,888	5,186	8,452	8,438	30964
CO	10,822	6,316	10,292	10,274	37704
VOC	3,098	1,808	2,946	2,942	10794
PM10	8,256	4,818	7,850	7,838	28762
SO2	1,714	1,000	1,630	1,628	5972
NH3	16,430	9,588	15,624	15,598	57240

	Quarters (lbs)				
Peak Load Operation	1	2	3	4	Annual (lbs)
NOx	1,828	130	5,622	1,658	9238
CO	2,226	158	6,846	2,018	11248
VOC	638	46	1,962	578	3224
PM10	1,690	120	5,198	1,532	8540
SO2	352	24	1,080	318	1774
NH3	3,368	240	10,360	3,054	17022

	Quarters (lbs)				
Hot Starts	1	2	3	4	Annual (lbs)
NOx	223	493	366	302	1384
CO	228	505	375	310	1418
VOC	32	71	53	44	200
PM10	88	195	145	120	548
SO2	18	40	30	25	113

	Quarters (lbs)				
Warm Starts	1	2	3	4	Annual (lbs)
NOx	58	701	964	1139	2862
CO	55	662	911	1076	2704
VOC	9	108	149	176	442
PM10	25	305	419	495	1244
SO2	5	62	86	101	254

	Quarters (lbs)				
Cold Starts	1	2	3	4	Annual (lbs)
NOx	149	447	50	646	1292
CO	127	380	42	549	1098
VOC	20	59	7	86	172
PM10	57	171	19	247	494
SO2	12	35	4	51	102

	Quarters (lbs)				
Total for Startups	1	2	3	4	Annual (lbs)
NOx	430	1641	1380	2087	5538
CO	410	1547	1328	1935	5220
VOC	61	238	209	306	814
PM10	170	671	583	862	2286
SO2	35	137	120	177	469

	Quarters (lbs)				
Turbine Total	1	2	3	4	Annual (lbs)
NOx	11,146	6,957	15,454	12,183	45,740
CO	13,458	8,021	18,466	14,227	54,172
VOC	3,797	2,092	5,117	3,826	14,832
PM10	10,116	5,609	13,631	10,232	39,588
SO2	2,101	1,161	2,830	2,123	8,215

	Quarters (lbs)				
Boiler	1	2	3	4	Annual (lbs)
NOx	95	386	97	97	675
CO	321	1,301	327	327	2276
VOC	43	176	44	44	307
PM10	81	329	83	83	576
SO2	11	45	11	11	78

	Quarters (lbs)				
Generator	1	2	3	4	Annual (lbs)
NOx	54	54	54	54	216
CO	11	11	11	11	44
VOC	2	2	2	2	8
PM10	2	2	2	2	8
SO2	1	1	1	1	4

	Quarters (lbs)				
Fire Pump	1	2	3	4	Annual (lbs)
NOx	43	43	43	43	172
CO	2	2	2	2	8
VOC	1	1	1	1	4
PM10	1	1	1	1	4
SO2	5	5	5	5	20

	Quarters (lbs)				
Cooling Tower	1	2	3	4	Annual (lbs)
NOx	0	0	0	0	0
CO	0	0	0	0	0
VOC	0	0	0	0	0
PM10	1,471	1,487	1,504	1,504	5966
SO2	0	0	0	0	0

	Quarters (lbs)				Annual	
Facility Total	1	2	3	4	(lbs)	(tons)
NOx	11,338	7,440	15,648	12,377	46803	23.4015
CO	13,792	9,335	18,806	14,567	56500	28.25
VOC	3,843	2,271	5,164	3,873	15151	7.5755
PM10	11,671	7,428	15,221	11,822	46142	23.071
SO2	2,118	1,212	2,847	2,140	8317	4.1585

Startup Assumptions

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	8.8	12.2	19.3	15.9	29.2	49.7
CO	9.2	10.8	14.3	16.3	27.6	42.2
VOC	1.4	1.4	1.4	2.3	4.5	6.6
PM10	3.2	3.2	3.2	6.3	12.7	19
SO2	0.7	0.7	0.7	1.3	2.6	3.9
Duration (hours)	1	2	3			

Other Source Assumptions

	Boiler	Pump	Generator	Cooling Tower		
NOx	0.68	3.44	4.31	0		
CO	2.29	0.18	0.84	0		
VOC	0.31	0.1	0.16	0		
PM10	0.58	0.06	0.14	0.681		
SO2	0.08	0.38	0.1	0		

GTX100 EMISSION CALCULATIONS – ORIGINAL PROPOSAL

Emission Assumptions						
	Peak Load (Lbs/hr)			Base Load (Lbs/hr)		
NOx	5.133			3.469		
CO	6.226			4.224		
ROC	1.783			0.363		
PM10	4.726			3.222		
SO2	0.981			0.669		
NH3	9.2			6.3		
Operation Assumptions						
	Quarters					
	1	2	3	4	Annual	
Base load Operation per Turbine	1,123	1,188	751	852	3,914	
Peak Load Operation per Turbine/HRSG	929	559	1,347	1,246	4,081	
Hot Starts (number)	25	71	29	42	167	
Warm Starts (number)	8	20	1	1	30	
Cold Starts (number)	1	2	1	1	5	
Startup and Shutdown per Turbine (hours)	44	117	34	47	242	
Total Hours of Operation per Turbine	2096	1864	2132	2145	8237	
Auxiliary Boiler	140	568	143	143	994	
Emergency Generator	12.5	12.5	12.5	12.5	50	
Firewater Pump	12.5	12.5	12.5	12.5	50	
Cooling Tower	2160	2184	2208	2208	8760	
Estimated Quarterly Emissions						
	Quarters (lbs)					
Base load Operation	1	2	3	4	Annual	
NOx	7,792	8,242	5,210	5,912	27156	
CO	9,488	10,036	6,344	7,198	33066	
ROC	816	862	546	618	2842	
PM10	7,236	7,656	4,840	5,490	25222	
SO2	1,502	1,590	1,004	1,140	5236	
NH3	14,150	14,968	9,462	10,736	49316	
					142838	

	Quarters (lbs)					
Peak Load Operation	1	2	3	4	Annual	
NOx	9,538	5,738	13,828	12,792	41896	
CO	11,568	6,960	16,772	15,516	50816	
ROC	3,312	1,994	4,804	4,444	14554	
PM10	8,780	5,284	12,732	11,778	38574	
SO2	1,822	1,096	2,642	2,444	8004	
NH3	17,094	10,286	24,784	22,926	75090	
Hot Starts						
NOx	853	2421	989	1432	5695	
CO	4020	11417	4663	6754	26854	
ROC	970	2755	1125	1630	6480	
PM10	160	454	186	269	1069	
SO2	33	92	38	55	218	
Warm Starts						
NOx	705	1762	88	88	2643	
CO	1505	3762	188	188	5643	
ROC	614	1534	77	77	2302	
PM10	103	258	13	13	387	
SO2	22	54	3	3	82	
Cold Starts						
NOx	123	246	123	123	615	
CO	205	410	205	205	1025	
ROC	79	157	79	79	394	
PM10	19	39	19	19	96	
SO2	4	8	4	4	20	
Total for Startups						
NOx	1681	4429	1200	1643	8953	
CO	5730	15589	5056	7147	33522	
ROC	1663	4446	1281	1786	9176	
PM10	282	751	218	301	1552	
SO2	59	154	45	62	320	
Turbine Total						
NOx	19,011	18,409	20,238	20,347	78,005	39.0025
CO	26,786	32,585	28,172	29,861	117,404	58.702
ROC	5,791	7,302	6,631	6,848	26,572	13.286
PM10	16,298	13,691	17,790	17,569	65,348	32.674
SO2	3,383	2,840	3,691	3,646	13,560	6.78
Boiler						
NOx	95	386	97	97	675	0.3375
CO	321	1,301	327	327	2276	1.138
ROC	43	176	44	44	307	0.1535
PM10	81	329	83	83	576	0.288
SO2	11	45	11	11	78	0.039

	Quarters (lbs)					
Generator	1	2	3	4	Annual	
NOx	54	54	54	54	216	0.108
CO	11	11	11	11	44	0.022
ROC	2	2	2	2	8	0.004
PM10	2	2	2	2	8	0.004
SO2	1	1	1	1	4	0.002
Fire Pump						
NOx	43	43	43	43	172	0.086
CO	2	2	2	2	8	0.004
ROC	1	1	1	1	4	0.002
PM10	1	1	1	1	4	0.002
SO2	5	5	5	5	20	0.01
Cooling Tower						
NOx	0	0	0	0	0	0
CO	0	0	0	0	0	0
ROC	0	0	0	0	0	0
PM10	1,471	1,487	1,504	1,504	5966	2.983
SO2	0	0	0	0	0	0
Facility Total						
NOx	19,203	18,892	20,432	20,541	79068	39.534
CO	27,120	33,899	28,512	30,201	119732	59.866
ROC	5,837	7,481	6,678	6,895	26891	13.4455
PM10	17,853	15,510	19,380	19,159	71902	35.951
SO2	3,400	2,891	3,708	3,663	13662	6.831

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	22.6	37.1	37.1	34.1	88.1	122.8
CO	83.5	89.5	89.5	160.8	188.1	204.8
ROC	19.6	19.7	19.7	38.8	76.7	78.6
PM10	3.2	3.2	3.2	6.4	12.9	19.3
SO2	0.7	0.7	0.7	1.3	2.7	4
Duration (hours)	1	2	3			
Lbs/hr	Boiler	Pump	Generator	Cooling Tower		
NOx	0.68	3.44	4.31	0		
CO	2.29	0.18	0.84	0		
ROC	0.31	0.1	0.16	0		
PM10	0.58	0.06	0.14	0.681		
SO2	0.08	0.38	0.1	0		

ALSTOM GTX100 TURBINES – 31.1 TON/YEAR NOX LIMIT

These calculations do not apply to any emission limit within the FSA, they are only included for purposes of completeness.

Emission Assumptions					
	Peak Load (Lbs/hr)			Base Load (Lbs/hr)	
NOx	5.133			3.469	
CO	6.226			4.224	
VOC	1.783			0.363	
PM10	4.726			3.222	
SO2	0.981			0.669	
NH3	9.2			6.3	
Operation Assumptions					
	Quarters (hours)				
	1	2	3	4	Annual (hours)
Base load Operation per Turbine	1,324	1,094	1247	1298	4,963
Peak Load Operation per Turbine/HRSG	500	321	849	509	2,179
Hot Starts (number)	14	31	23	19	87
Warm Starts (number)	33	39	2	24	98
Cold Starts (number)	3	13	1	9	26
Startup and Shutdown per Turbine (hours)	89.0	148.0	30.0	94.0	361.0
Total Hours of Operation per Turbine	1,913	1,563	2,126	1,901	7503
Auxiliary Boiler	140	568	143	144	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Firewater Pump	12.5	12.5	12.5	12.5	50
Cooling Tower	2160	2184	2208	2208	8760
Turbine Offline	247	621	82	307	1,257
Operating Turbines	2				

Estimated Quarterly Emissions

	Quarters (lbs)				
Base load Operation	1	2	3	4	Annual (lbs)
NOx	9,186	7,590	8,652	9,006	34434
CO	11,186	9,242	10,534	10,966	41928
VOC	962	794	906	942	3604
PM10	8,532	7,050	8,036	8,364	31982
SO2	1,772	1,464	1,668	1,736	6640
NH3	16,682	13,784	15,712	16,354	62532

	Quarters (lbs)				
Peak Load Operation	1	2	3	4	Annual (lbs)
NOx	5,134	3,296	8,716	5,226	22372
CO	6,226	3,998	10,572	6,338	27134
VOC	1,784	1,144	3,028	1,816	7772
PM10	4,726	3,034	8,024	4,812	20596
SO2	982	630	1,666	998	4276
NH3	9,200	5,906	15,622	9,366	40094

	Quarters (lbs)				
Hot Starts	1	2	3	4	Annual (lbs)
NOx	477	1057	784	648	2966
CO	2251	4985	3698	3055	13989
VOC	543	1203	892	737	3375
PM10	90	198	147	122	557
SO2	18	40	30	25	113

	Quarters (lbs)				
Warm Starts	1	2	3	4	Annual (lbs)
NOx	2907	3436	176	2114	8633
CO	6207	7336	376	4514	18433
VOC	2531	2991	153	1841	7516
PM10	426	503	26	310	1265
SO2	89	105	5	65	264

	Quarters (lbs)				
Cold Starts	1	2	3	4	Annual (lbs)
NOx	368	1596	123	1105	3192
CO	614	2662	205	1843	5324
VOC	236	1022	79	707	2044
PM10	58	251	19	174	502
SO2	12	52	4	36	104

	Quarters (lbs)				
Total for Startups	1	2	3	4	Annual (lbs)
NOx	3752	6089	1083	3867	14791
CO	9072	14983	4279	9412	37746
VOC	3310	5216	1124	3285	12935
PM10	574	952	192	606	2324
SO2	119	197	39	126	481

Quarters (lbs)

Turbine Total	1	2	3	4	Annual (lbs)
NOx	18,072	16,975	18,451	18,099	71,597
CO	26,484	28,223	25,385	26,716	106,808
VOC	6,056	7,154	5,058	6,043	24,311
PM10	13,832	11,036	16,252	13,782	54,902
SO2	2,873	2,291	3,373	2,860	11,397

	Quarters (lbs)				
Boiler	1	2	3	4	Annual (lbs)
NOx	95	386	97	98	676
CO	321	1,301	327	330	2279
VOC	43	176	44	45	308
PM10	81	329	83	84	577
SO2	11	45	11	12	79

	Quarters (lbs)				
Generator	1	2	3	4	Annual (lbs)
NOx	54	54	54	54	216
CO	11	11	11	11	44
VOC	2	2	2	2	8
PM10	2	2	2	2	8
SO2	1	1	1	1	4

	Quarters (lbs)				
Fire Pump	1	2	3	4	Annual (lbs)
NOx	43	43	43	43	172
CO	2	2	2	2	8
VOC	1	1	1	1	4
PM10	1	1	1	1	4
SO2	5	5	5	5	20

	Quarters (lbs)				
Cooling Tower	1	2	3	4	Annual (lbs)
NOx	0	0	0	0	0
CO	0	0	0	0	0
VOC	0	0	0	0	0
PM10	1,471	1,487	1,504	1,504	5966
SO2	0	0	0	0	0

	Quarters (lbs)				Annual	
Facility Total	1	2	3	4	(lbs)	(tons)
NOx	18,264	17,458	18,645	18,294	72661	36.3305
CO	26,818	29,537	25,725	27,059	109139	54.5695
VOC	6,102	7,333	5,105	6,091	24631	12.3155
PM10	15,387	12,855	17,842	15,373	61457	30.7285
SO2	2,890	2,342	3,390	2,878	11500	5.75

Startup Assumptions

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	22.6	37.1	37.1	34.1	88.1	122.8
CO	83.5	89.5	89.5	160.8	188.1	204.8
VOC	19.6	19.7	19.7	38.8	76.7	78.6
PM10	3.2	3.2	3.2	6.4	12.9	19.3
SO2	0.7	0.7	0.7	1.3	2.7	4
Duration (hours)	1	2	3			

Other Source Assumptions

	Boiler	Pump	Generator	Cooling Tower
NOx	0.68	3.44	4.31	0
CO	2.29	0.18	0.84	0
VOC	0.31	0.1	0.16	0
PM10	0.58	0.06	0.14	0.681
SO2	0.08	0.38	0.1	0

ALSTOM GTX100 TURBINES – 23.4 TON/YEAR NOX LIMIT

These calculations do not apply to any emission limit within the FSA, they are only included for purposes of completeness.

Emission Assumptions					
	Peak Load (Lbs/hr)		Base Load (Lbs/hr)		
NOx	5.133			3.469	
CO	6.226			4.224	
VOC	1.783			0.363	
PM10	4.726			3.222	
SO2	0.981			0.669	
NH3	9.2			6.3	
Operation Assumptions					
	Quarters (hours)				
	1	2	3	4	Annual (hours)
Base load Operation per Turbine	1,304	761	1240	1238	4,543
Peak Load Operation per Turbine/HRSG	183	13	563	166	925
Hot Starts (number)	14	31	23	19	87
Warm Starts (number)	2	24	33	39	98
Cold Starts (number)	3	9	1	13	26
Startup and Shutdown per Turbine (hours)	27	106	92	136	361
Total Hours of Operation per Turbine	1,514	880	1,895	1,540	5829
Auxiliary Boiler	140	568	143	144	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Firewater Pump	12.5	12.5	12.5	12.5	50
Cooling Tower	2160	2184	2208	2208	8760
Turbine Offline	646	1,304	313	668	2,931
Operating Turbines	2				

Estimated Quarterly Emissions

	Quarters (lbs)				
Base load Operation	1	2	3	4	Annual (lbs)
NOx	9,048	5,280	8,604	8,590	31522
CO	11,016	6,428	10,476	10,458	38378
VOC	946	552	900	898	3296
PM10	8,402	4,904	7,990	7,978	29274
SO2	1,744	1,018	1,660	1,656	6078
NH3	16,430	9,588	15,624	15,598	57240

	Quarters (lbs)				
Peak Load Operation	1	2	3	4	Annual (lbs)
NOx	1,878	134	5,780	1,704	9496
CO	2,278	162	7,010	2,068	11518
VOC	652	46	2,008	592	3298
PM10	1,730	122	5,322	1,570	8744
SO2	360	26	1,104	326	1816
NH3	3,368	240	10,360	3,054	17022

	Quarters (lbs)				
Hot Starts	1	2	3	4	Annual (lbs)
NOx	477	1057	784	648	2966
CO	2251	4985	3698	3055	13989
VOC	543	1203	892	737	3375
PM10	90	198	147	122	557
SO2	18	40	30	25	113

	Quarters (lbs)				
Warm Starts	1	2	3	4	Annual (lbs)
NOx	176	2114	2907	3436	8633
CO	376	4514	6207	7336	18433
VOC	153	1841	2531	2991	7516
PM10	26	310	426	503	1265
SO2	5	65	89	105	264

	Quarters (lbs)				
Cold Starts	1	2	3	4	Annual (lbs)
NOx	368	1105	123	1596	3192
CO	614	1843	205	2662	5324
VOC	236	707	79	1022	2044
PM10	58	174	19	251	502
SO2	12	36	4	52	104

	Quarters (lbs)				
Total for Startups	1	2	3	4	Annual (lbs)
NOx	1021	4276	3814	5680	14791
CO	3241	11342	10110	13053	37746
VOC	932	3751	3502	4750	12935
PM10	174	682	592	876	2324
SO2	35	141	123	182	481

	Quarters (lbs)				
Turbine Total	1	2	3	4	Annual (lbs)
NOx	11,947	9,690	18,198	15,974	55,809
CO	16,535	17,932	27,596	25,579	87,642
VOC	2,530	4,349	6,410	6,240	19,529
PM10	10,306	5,708	13,904	10,424	40,342
SO2	2,139	1,185	2,887	2,164	8,375

	Quarters (lbs)				
Boiler	1	2	3	4	Annual (lbs)
NOx	95	386	97	98	676
CO	321	1,301	327	330	2279
VOC	43	176	44	45	308
PM10	81	329	83	84	577
SO2	11	45	11	12	79

	Quarters (lbs)				
Generator	1	2	3	4	Annual (lbs)
NOx	54	54	54	54	216
CO	11	11	11	11	44
VOC	2	2	2	2	8
PM10	2	2	2	2	8
SO2	1	1	1	1	4

	Quarters (lbs)				
Fire Pump	1	2	3	4	Annual (lbs)
NOx	43	43	43	43	172
CO	2	2	2	2	8
VOC	1	1	1	1	4
PM10	1	1	1	1	4
SO2	5	5	5	5	20

	Quarters (lbs)				
Cooling Tower	1	2	3	4	Annual (lbs)
NOx	0	0	0	0	0
CO	0	0	0	0	0
VOC	0	0	0	0	0
PM10	1,471	1,487	1,504	1,504	5966
SO2	0	0	0	0	0

	Quarters (lbs)				Annual	
Facility Total	1	2	3	4	(lbs)	(tons)
NOx	12,139	10,173	18,392	16,169	56873	28.4365
CO	16,869	19,246	27,936	25,922	89973	44.9865
VOC	2,576	4,528	6,457	6,288	19849	9.9245
PM10	11,861	7,527	15,494	12,015	46897	23.4485
SO2	2,156	1,236	2,904	2,182	8478	4.239

Startup Assumptions

	Single Turbine Train (lbs/hr)			Two Turbine Trains (lbs)		
Start Type->	Hot	Warm	Cold	Hot	Warm	Cold
NOx	22.6	37.1	37.1	34.1	88.1	122.8
CO	83.5	89.5	89.5	160.8	188.1	204.8
VOC	19.6	19.7	19.7	38.8	76.7	78.6
PM10	3.2	3.2	3.2	6.4	12.9	19.3
SO2	0.7	0.7	0.7	1.3	2.7	4
Duration (hours)	1	2	3			

Other Source Assumptions

	Boiler	Pump	Generator	Cooling Tower
NOx	0.68	3.44	4.31	0
CO	2.29	0.18	0.84	0
VOC	0.31	0.1	0.16	0
PM10	0.58	0.06	0.14	0.681
SO2	0.08	0.38	0.1	0

EMISSION REDUCTION CREDITS – ORIGINAL PROPOSAL

			Original Certificate Value								
			Quarter (lbs)								
District	Certificate	Pollutant	1	2	3	4	Annual (lbs)	Annual (tons)	Distance Ratio	Additional Adjustment	Comments
Placer	2001-22	PM10	2,578	22,263	16,085	15,916	56,842	28.42	1.3		
Placer	2001-23	NOx	5,050	5,050	5,050	5,050	20,200	10.10	2		
Placer	2001-24	PM10	14,700	14,700	14,700	14,700	58,800	29.40	2		
Placer	2001-26	VOC	33,512	33,512	33,512	33,512	134,048	67.02	2	2.6	VOC for NOx Trading Ratio
Yolo-Solano	EC-209 (EC-238)	NOx	0	6,888	0	3,542	10,430	5.22	2.1	10%	10% is held back for sale in Yolo-Solano only.
Yolo-Solano	EC-210	NOx	0	10,620	0	4,414	15,034	7.52	2.1	10%	10% is held back for sale in Yolo-Solano only.

			Modified Certificate Value					
			Quarter (lbs)					
District	Certificate	Pollutant	1	2	3	4	Annual (lbs)	Annual (tons)
Placer	2001-22	PM10	1,983.08	17,125.38	12,373.08	12,243.08	43,724.62	21.86
Placer	2001-23	NOx	2,525.00	2,525.00	2,525.00	2,525.00	10,100.00	5.05
Placer	2001-24	PM10	7,350.00	7,350.00	7,350.00	7,350.00	29,400.00	14.70
Placer	2001-26	VOC for NOx	6,444.62	6,444.62	6,444.62	6,444.62	25,778.46	12.89
Yolo-Solano	EC-209 (EC-238)	NOx	0.00	2,952.00	0.00	1,518.00	4,470.00	2.24
Yolo-Solano	EC-210	NOx	0.00	4,551.43	0.00	1,891.71	6,443.14	3.22

	Total by Pollutant					
	Quarter (lbs)					
Pollutant	1	2	3	4	Annual (lbs)	Annual (tons)
NOx	8,970	16,473	8,970	12,379	46,792	23.40
PM10	9,333	24,475	19,723	19,593	73,125	36.56

EMISSION REDUCTION CREDITS – AMENDED PROPOSAL

Original Certificate Value											
			Quarter (lbs)				Annual				
District	Certificate	Pollutant	1	2	3	4	(lbs)	(tons)	Distance Ratio	Additional Adjustment	Comments
Placer	2001-22	PM10	2,578	22,263	16,085	15,916	56,842	28.42	1.3		
Placer	2001-23	NOx	5,050	5,050	5,050	5,050	20,200	10.10	2		
Placer	2001-24	PM10	14,700	14,700	14,700	14,700	58,800	29.40	2		
Placer	2001-26	VOC	33,512	33,512	33,512	33,512	134,048	67.02	2	2.6	VOC for NOx Trading Ratio
Yolo-Solano	EC-209 (EC-238)	NOx	0	6,888	0	3,542	10,430	5.22	2.1	10%	10% is held back for sale in Yolo-Solano only.
Yolo-Solano	EC-210	NOx	0	10,620	0	4,414	15,034	7.52	2.1	10%	10% is held back for sale in Yolo-Solano only.
Placer	***Landfill*** or SMAQMD Bank	NOx	5,472	7,778	2,599	4,151	19,999	10.00	1.3		Est. only, to be developed during construction

Modified Certificate Value								
			Quarter (lbs)				Annual	
District	Certificate	Pollutant	1	2	3	4	(lbs)	(tons)
Placer	2001-22	PM10	1,983.08	17,125.38	12,373.08	12,243.08	43,724.62	21.86
Placer	2001-23	NOx	2,525.00	2,525.00	2,525.00	2,525.00	10,100.00	5.05
Placer	2001-24	PM10	7,350.00	7,350.00	7,350.00	7,350.00	29,400.00	14.70
Placer	2001-26	VOC	6,444.62	6,444.62	6,444.62	6,444.62	25,778.46	12.89
Yolo-Solano	EC-209 (EC-238)	NOx	0.00	2,952.00	0.00	1,518.00	4,470.00	2.24
Yolo-Solano	EC-210	NOx	0.00	4,551.43	0.00	1,891.71	6,443.14	3.22
Placer	Landfill	NOx	4,209.00	5,983.00	1,999.00	3,193.00	15,384.00	7.69

Total by Pollutant						
	Quarter (lbs)				Annual	
Pollutant	1	2	3	4	(lbs)	(tons)
NOx	13,179	22,456	10,969	15,572	62,176	31.09
PM10	9,333	24,475	19,723	19,593	73,125	36.56

Air Quality

Appendix D

TECHNICAL PAPER

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Selective Catalytic Oxidation of Ammonia over Copper-Cerium Composite Catalyst

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ABSTRACT

This work considers the oxidation of ammonia (NH_3) by selective catalytic oxidation (SCO) over a copper (Cu)–cerium (Ce) composite catalyst at temperatures between 150 and 400 °C. A Cu-Ce composite catalyst was prepared by coprecipitation of copper nitrate and cerium nitrate at various molar concentrations. This study also considers how the concentration of influent NH_3 (500–1000 ppm), the space velocity (72,000–110,000 hr^{-1}), the relative humidity (12–18%) and the concentration of oxygen (4–20%) affect the operational stability and the capacity for removing NH_3. The effects of the O_2 and NH_3 content of the carrier gas on the catalyst's reaction rate also are considered. The experimental results show that the extent of conversion of NH_3 by SCO in the presence of the Cu-Ce composite catalyst was a function of the molar ratio. The NH_3 was removed by oxidation in the absence of Cu-Ce composite catalyst, and ~99.2% NH_3 reduction was achieved during catalytic oxidation over the Cu-Ce (6:4, molar/molar) catalyst at 400 °C with an O_2 content of 4%. Moreover, the effect of the initial concentration and reaction temperature on the removal of NH_3 in the gaseous phase was also monitored at a gas hourly space velocity of less than 92,000 hr^{-1}.

INTRODUCTION

Extensively used in industry, ammonia (NH_3) is an important chemical product with diverse uses. It is eliminated in many ways, such as in the ammonium nitrate (NH_4NO_3) production industry, livestock feedlots, urea manufacturing plants, the nitrogen (N_2) fertilizer application industry, fossil fuel combustion or petroleum refineries, and the refrigeration industry. All of the products of NH_3 produced in these industries either are toxic inorganic gases with a pungent malodorous component under ambient conditions or can harm the health of the public.[1–3] Moreover, typical biological, physical, and chemical treatments, such as those that involve biofilters,[4,5] stripping,[6] absorption,[7] postcombustion control technologies,[8] microwave-plasma discharge,[9] electrochemical oxidation,[10] and activated carbon fibers (ACFs) and soot adsorption,[11,12] only induce a phase transformation and may yield contaminated sludge or an adsorbent, either of which require further disposal. The maintenance and operating costs associated with physical and chemical approaches are high. Hence, the removal and control of NH_3 and the prevention of its emission from air and waste streams are important. These tasks are challenging because environmental laws and regulations concerning safe discharge are becoming increasingly strict.

Recently, catalytic oxidation involving dedicated catalysts has been determined to improve advanced oxidation processes (AOPs). Dedicated catalysts can accelerate oxidation under mild operating conditions. The selective catalytic oxidation (SCO) technology that converts NH_3 in a stream of gas into molecular N_2 and water is one method of eliminating NH_3 pollution.[13–17] Catalytic oxidation has been reported to proceed as follows.[18–20]

$$4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O \quad (1)$$

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O \quad (2)$$

The products are formed on the surface of the catalyst by reactions 1 and 2. Most researchers believe that the decomposition of nitric oxide (NO) and the interaction of NH_3 with NO yield N_2.[18] Typically, at high temperatures, the total rate of oxidation of NH_3 is limited by the rate of diffusion of NH_3 to the catalyst, as is typical for processes

IMPLICATIONS

Extensively used in industry, NH_3 is an important chemical product with diverse uses. It is eliminated in many ways, such as in the ammonium nitrate production industry, livestock feedlots, urea manufacturing plants, the nitrogen fertilizer application industry, fossil fuel combustion or petroleum refineries, and the refrigeration industry. This work addresses the activity of the Cu-Ce composite catalyst in the oxidation of NH_3, as determined by various parameters, and its effect on the removal of NH_3 from an effluent stream using the SCO process.

in which external mass transfer is limited. However, the rates of reactions 1 and 2 are determined by the reaction mechanism and depend crucially on the content of the catalyst.[19]

Only a few catalysts have been used to promote the oxidation of gaseous NH_3. For example, Amblard et al.[3] demonstrated the excellent selective conversion of NH_3 to N_2 (>90%) using γ-aluminum oxide (Al_2O_3)-supported nickel (Ni) in SCO processes. Moreover, Wang et al.,[15] who developed Ni-based catalysts for oxidizing fuel gas obtained by gasifying biomass, determined that fresh Ni-based catalysts are more active at low temperatures in the decomposition of NH_3. According to their results, the partial pressure of hydrogen (H_2) in the flue gas was crucial in governing the NH_3 oxidation. Liang et al.[20] studied NH_3 oxidation in a fixed-bed microreactor at temperatures between 600 and 750 °C at gas hourly space velocity (GHSV) = 1800–3600 hr^{-1}. According to their results, the conversion of NH_3 reached 98.7 and 99.8% on nitrided $MoNx/\alpha$-Al_2O_3 and Ni-$MoNy/\alpha$-Al_2O_3 catalysts, respectively. Schmidt-Szalowski et al.[13] developed a pore structure-based hypothetical model of the activity and selectivity of a cobalt oxide (Co_3O_4) catalyst involved in the oxidation of NH_3, describing the model's macrostructure (including the presence of mesopores with sizes <0.1 μm).

The environmental pollution problems associated with NH_3 are causing most countries to tighten steadily their relevant environmental regulations. Therefore, new technologies have been developed in this field, but a need remains to further refine current treatment technologies and develop technologies for removing NH_3 that contaminates gaseous industrial waste streams. Moreover, the most important washcoat component in a catalyst is cerium (Ce), which is added as a stabilizer and to store oxygen (O_2). Ce stabilizes the washcoat layer, increases the thermal resistance, enhances the catalytic activity of precious metals, and enables the storage of O_2.[21–24] However, the feasibility of using a copper (Cu)–Ce composite catalyst to determining the reactive properties of these active metals in the SCO process seldom has been addressed. This work addresses the activity of the Cu-Ce composite catalyst in the oxidation of NH_3, as determined by various parameters, and its effect on the removal of NH_3 from an effluent stream using the SCO process. A Brunauer–Emmett–Teller method (BET) surface area analysis, X-ray powder diffraction (XRD), and energy-dispersive X-ray spectrometry (EDX) were used to characterize the Cu-Ce composite catalyst.

MATERIALS AND METHODS

Cu-Ce bimetallic composite catalysts were prepared by coprecipitating copper (II) nitrate ($CuNO_3$, GR grade, Merck) with cerium (III) nitrate ($Ce(NO_3)_3$, GR grade, Merck) in four molar ratios of 6:4, 7:3, 8:2, and 9:1. These compounds were then calcined at 500 °C in an airstream for 4 hr. The powder thus generated was formed into tablets using acetic acid ($C_2H_4O_2$) as a binder. The tablets were later reheated at 300 °C to burn the binder out of the Cu-Ce bimetallic composite. They then were crushed and sieved into particles of various sizes from 0.15 to 0.25 mm for later use.

The specific surface areas of the Cu-Ce composite catalysts were determined by the physical adsorption of N_2 at 77 K using a BET model and a BET surface area analyzer (ASAP 2000, Micromeritics). X-ray diffractograms were obtained using a Diano-8536 diffractometer with CuKα radiation as the source. During analysis, the sample was scanned from 20 to 80° at a rate of 0.4°/min. UV-Vis absorption spectra of the solid sample were obtained using a photo spectrophotometer (MCPD-3000, OTSUKA Electronics). The reflectance was measured in relation to a barite ($BaSO_4$) standard. Scanning electron microscopy, using an energy-dispersive X-ray spectrometer (SEM/EDX, JEOL, JSM-6400, Kevex, DeltaII), clarified the morphology of the catalysts and yielded information on the distribution of Cu and Ce on the surfaces of the catalysts.

Experiments were conducted on a tubular fixed-bed flow quartz reactor (TFBR). Two flowing gases, namely NH_3 and O_2, were used in preparing the feed mixture in the diluting gas, helium (He), which flowed into the inlet of the reactor. A mass flow regulator was used to control independently the flows of NH_3 and O_2. Highly pure He was used as a carrier gas at a flow rate from 8 to 13 L/min, controlled using a mass flow meter (830 Series Side-Trak, Sierra). The mass of each catalyst was 1 g (with an empty bed volume of ~1.2 cm^3). An inert material formed from hydrophilic and inert γ-Al_2O_3 spheres was used to increase the interfacial area between the solid and the gas phase to improve the mass transfer of NH_3 from water. This method resembled that of Huang et al.,[6] who conducted experiments on the catalytic oxidation of NH_3. A reaction tube (300 mm length with an inner diameter of 28 mm) was placed inside a split tube furnace. The tube that contained the catalyst also was placed in the furnace. The temperature was measured using two type-K thermocouples (KT-110, Kirter), each with a diameter of 0.5 mm, which were positioned in front of and behind the catalyst bed, respectively. The thermocouples were also connected to a proportional integral derivative (PID) controller (FP21, Shimaaen) to maintain the temperature within the tube within ±0.5%. The concentration of the feed gas (GHSV, 92,000 mL/hr-g) was maintained at 1000-ppm NH_3 and the O_2 concentration was 4%. The catalyst was not deactivated during testing. Figure 1 depicts the TFBR.

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BIOLOGICAL RESOURCES

Testimony of Stuart Itoga

INTRODUCTION

This section provides the Energy Commission staff's final analysis of potential impacts to biological resources from the construction and operation of the Roseville Energy Park (REP) proposed by Roseville Electric (RE). This analysis addresses potential impacts to state and federally listed species, species of special concern, and areas of critical biological concern; describes the biological resources of the project site and at the locations of associated facilities; determines the need for mitigation and 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 compliance with applicable laws, ordinances, regulations and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the RE Application for Certification (AFC) (Roseville 2003a), site visits, workshops, staff data requests, applicant responses (CH2MHill 2004a), Biological Assessment (Roseville 2004b), and consultations with various agency representatives.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

- **Endangered Species Act 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 protection of threatened and endangered plant and animal species, and their critical habitat.

- **Migratory Bird Treaty Act**

  Title 16, United States Code, sections 703-712, prohibit the take of migratory birds.

- **Clean Water Act**

  33 United States Code, section 404 et seq., prohibits the discharge of dredged or fill material into the waters of the United States without a permit.

STATE

- **California Endangered Species Act of 1984**

  Fish and Game Code sections 2050 et seq., protect California's rare, threatened and endangered species.

- **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 or any bird.

- **Birds of Prey or Eggs-Take, Possess, or Destroy**

  Fish and Game Code section 3503.5, protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any 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 section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird.

- **Fully Protected Species**

  Fish and Game Code sections 3511, 4700, 5050, 5515 prohibit take of animals that are classified as Fully Protected in California.

- **Significant Natural Areas**

  Fish and Game Code section 1930 et seq. designate certain areas such as refuges, natural sloughs, riparian areas and vernal pools as significant wildlife habitat.

- **Streambed Alteration Agreement**

  Fish and Game Code section 1600 et seq., require the California Department of Fish and Game to review project impacts to waterways, including impacts to vegetation and wildlife from sediment, diversions and other disturbances.

- **Native Plant Protection Act of 1977**

  Fish and Game Code section 1900 et seq., designate state rare, threatened, and endangered plants.

- **California Code of Regulations**

  Title 14, sections 670.2 and 670.5 list animals of California designated as threatened or endangered.

LOCAL

- **Placer County General Plan**

  Appendix C, Conservation Goals, Policies & Programs. Plant and Animal Communities. Biological Resource protection measures include: avoiding areas rich in wildlife or of a fragile ecological nature, maintaining fish and wildlife populations at viable levels, identifying and protecting critical habitat, reducing wetland impacts to point of no net loss, conserving upland areas adjacent to wetlands and riparian areas when they are critical to survival and nesting of wetland and riparian species, preserving habitats of rare, threatened or endangered species, and developing a comprehensive habitat management plan.

- **Placer Legacy Open Space and Agricultural Conservation Program Natural Community Conservation Plan and Habitat Conservation Plan**

  Protect the diversity of plant and animal communities, including endangered and other special-status species, and establish open-space buffers between communities.

ENVIRONMENTAL SETTING

REGIONAL

The proposed REP site is located in southwestern Placer County, California. Placer County extends from the southeastern Sacramento Valley into the foothills of the Sierra Nevada Mountain Range. The proposed site is located within the Curry, Kaesberg, and Pleasant Grove Creek watersheds, within ten miles of Folsom Lake and the American River. Nearby are the cities of Roseville, Lincoln and Rocklin. Although the region is widely recognized for its vernal pool grasslands, other habitat types include annual grasslands and oak woodlands, seasonal wetlands, and riparian habitats.

The region is characterized by rapid growth, resulting in fragmentation of wildlife habitat, including Northern Hardpan and Northern Volcanic Mudflow vernal pool grasslands. Vernal pool grasslands are valuable because of the abundance of federally and state listed sensitive species (15 federally listed, 8 state listed) that inhabit them. In addition, the U. S. Fish and Wildlife Service (USFWS) recently designated 32,134 acres in Placer County (Unit 12, West Placer Unit) as critical habitat for vernal pool species. The West Placer Unit (including the proposed REP) contains 70 percent of remaining vernal pools in Placer County (Federal Register, 2003).

LOCAL

The proposed REP is located directly north of the Pleasant Grove Wastewater Treatment Plant (PGWWTP). To the west of the proposed REP is a dog kennel and to the north Pleasant Grove Creek. On the eastern border of the proposed REP is a tributary to Pleasant Grove Creek. The proposed REP, and surrounding areas, are mostly vernal pool grasslands, but some areas of the proposed site are being used for activities associated with construction of the PGWWTP (equipment cleaning, mobile offices, parking areas).

The proposed REP is located on 40 acres that provide habitat for a variety of wildlife. Historically vernal pool fairy shrimp have been documented approximately one-mile northeast of the proposed REP and at the adjacent PGWWTP. A USFWS Biological Opinion (BO) issued for the PGWWTP indicated that vernal pool fairy shrimp were observed in pools on and adjacent to the PGWWTP site. California linderiella and dwarf downingia were also documented (USFWS 1999). Recently, vernal pool fairy shrimp were documented adjacent to the proposed REP (Roseville 2004b), and dwarf downingia documented on the proposed REP site in 2002 (URS 2002). In addition, the proposed REP provides suitable habitat to support other sensitive plants and animals. In addition to vernal pool grasslands, other natural habitat types on the site or in close proximity include: seasonal wetland, oak woodland and riparian habitats.

Sensitive species surveys were conducted for the proposed REP site, a one-mile radius around it, and the proposed linear facilities routes. Sensitive species that may occur on the REP site and associated facilities, or in the vicinity, include those listed in **Biological Resources Table 1**.

Biological Resources Table 1
Special Status Species Evaluated for REP

Scientific Name Common Name	Fed/State/DFG/CNPS*	Likelihood to Occur	Observed
Riparia riparia (nesting) Bank swallow	Threatened/-/-/-	Low	No
Falco peregrinus anatum (nesting) American peregrine falcon	Endangered/-/-/-	Low	No
Buteo swainsoni (nesting) Swainson's hawk	Threatened/-/-/-	High	Yes
Haliaeetus leucocephalus (nesting and wintering) Bald eagle	Endangered/-/-/-	Moderate	No
Charadrius montanus Mountain plover	Proposed/SC/-/-	Low	No
Grus canadensis tabida (nesting and wintering) Greater sandhill crane	Threatened/-/-/-	Moderate	No
Thamnophis gigas Giant garter snake	Threatened/Threatened/-/-	Low	No
Ambystoma californiense California tiger salamander	Candidate/SC/-/-	Low	No
Rana aurora draytoni California red-legged frog	Threatened/SC/-/-	Low	No
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon	Threatened/Threatened/-/-	Low	No
Oncorhynchus tshawytscha Central Valley fall-run chinook salmon	Candidate/SC/-/-	Low	No
Oncorhynchus tshawytscha Winter-run chinook salmon	Endangered/Endangered/-/-	Low	No

Oncorhynchus mykiss Central Valley steelhead	Threatened/-/-/-	Low	No
Hypomesus transpacificus Delta smelt	Threatened/Threatened/-/-	Low	No
Pogonichtys macrolepidotus Sacramento splittail	Threatened/-/-/-	Low	No
Branchinecta lynchi Vernal pool fairy shrimp	Threatened/-/-/-	High	Yes
Lepidurus packardi Vernal pool tadpole shrimp	Endangered/-/-/-	High	No
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	Threatened/-/-/-	High	No
Gratiola heterosepala Boggs Lake hedge-hyssop	Endangered/-/-/1B	Low	No
Orcuttia viscida Sacramento orcutt grass	Endangered/Endangered/-/1B	Low	No
Perognathus inornatus inornaturs San Joaquin pocket mouse	SC/-/-/-	Low	No
Myotis thysanode Fringed Myotis	SC/-/-/-	Low	No
Eumops perotis californicus Greater western mastiff bat	SC/-/SC/-	Low	No
Myotis volan Long-legged Myotis	SC/-/-/-	Low	No
Myotis ciliolabrum Small-footed Myotis	SC/-/-/-	Moderate	No
Corynorhinus townsendii townsendii Townsend's western big-eared bat	SC/-/-/-	Moderate	No

Antrozous pallidus Pallid bat	-/-/SC/-	Moderate	No
Lasiurus blossevilii Red bat	-/-/Proposed/-	Moderate	No
Aquila chysaetos Golden eagle	-/-/Fully Protected/-	High	Yes
Agelaius tricolor (nesting colony) Tricolored blackbird	SC/-/SC/-	Moderate	No
Athene cunicularia hypugea Western burrowing owl	SC/-/SC/-	Moderate	No
Elanus leucurus (nesting) White-tailed kite	-/-/Fully Protected/-	High	Yes
Empidonax trailli brewsteri (nesting) Little willow flycatcher	SC/-/-/-	Moderate	No
Buteo regalis (wintering) Ferruginous hawk	SC/-/-/SC	High	Yes
Accipiter cooperi (nesting) Cooper's hawk	-/-/SC/-	High	No
Eremophila alpestris Horned lark	-/-/SC/-	High	Yes
Plegadis chihi White-faced ibis	SC/-/SC/-	Moderate	No
Phrynosoma coronatum frontale California horned lizard	SC/-/SC/-	Low	No
Clemmys marmorata Northwestern pond turtle	SC/-/SC/-	Moderate	No
Scaphiopus hammondii Western spadefoot	SC/-/SC/-	High	No
Lampetra ayresi River lamprey	SC/-/SC/-	Low	No
Lampetra tridenta Pacific lamprey	SC/-/-/-	Low	No
Acipenser medirostris	SC/-/SC/-	Low	No

Green sturgeon			
Spirinchus thaleichthys Longfin smelt	SC/-/SC/-	Low	No
Linderiella occidentalis California linderiella	SC/-/-/-	High	No
Legenere limosa Legenere	SC/-/-/1B	Moderate	No
Downingia pusilla Dwarf downingia	-/-/-/2	High	Yes
Balsamorhiza macrolepis macrolepis Big-scale balsamroot	-/-/-/1B	Moderate	No
Navarretia myersii myersii Pincushion navarretia	-/-/-/1B	Moderate	No
Cordylanthus mollis hispidus Hispid bird's beak	SC/-/-/1B	Moderate	No
Sagittaria sanfordii *Sanford's* arrowhead	SC/-/-/1B	Low	No
Juglans califonica hindsii *Northern* California black walnut	SC/-/-/1B	High	Yes
Juncus leiospermus leiospermus Red Bluff dwarf rush	-/-/-/1B	Moderate	No

- Source: Roseville Electric for the REP (Roseville 2003a), and Roseville Energy Facility (REF 2002).
- ***Federal/State/DFG/CNPS** Status Abbreviations: Endangered=species threatened with extinction, Threatened=species likely to become endangered, Candidate=Candidate for listing, SC= Species of Special Concern, Fully protected=provides additional protection to animals that are rare or threatened with extinction. California Native Plant Society (CNPS): 1B=Rare or endangered in California and elsewhere, 2=Rare or endangered in California, more common elsewhere. •= Surveys not conducted, assumed presence. (-) = No special status listing.

IMPACTS AND ANALYSIS

Regional development is causing the loss and fragmentation of wildlife habitats, especially vernal pool grassland ecosystems. There is a large and growing body of scientific evidence that habitat fragmentation can drive plant and animal populations to extinction. For some species, loss in population is about proportional to loss of habitat (Brewer 1994). As habitat patches become smaller and farther away from each other, populations become isolated. Isolating populations reduces the exchange of genetic

information between populations. Reduction in the exchange of genetic information between different populations results in inbreeding, population crashes and extinction. Habitat fragmentation is a major concern not only regionally (Placer Legacy Habitat Conservation Plan is currently being developed), but also statewide, (Hildner et al. 2003, Crooks 2002, Riley et al 2003, Leidy and White 1996, Stebbins 1985, Barry and Shaffer 1994, Jennings and Hayes 1994), nationally (Burhans and Thompson 1999, Johnson and Igl 2001, Vickery and Melvin 1994) and globally (Pertoldi et al. 2001,Tocher et al. 1997, Astorga and Farfan 2001).

STAFF'S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

The California Environmental Quality Act (CEQA) defines direct impacts as directly attributable to the project and occurring 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 and related to the project. Cumulative impacts are defined as those occurring when effects of the project are added to other closely-related past, present and probable future projects.

Using the aforementioned definitions, staff analyzes the potential direct, indirect and cumulative impacts to state and federally listed species, species of special concern, wetlands and other areas of critical concern. Energy Commission staff recommends conditions of certification to specify mitigation measures which help avoid or reduce impacts to biological resources to levels less than significant. These conditions also ensure that the project owner will be in compliance with all applicable laws, ordinances, regulations and standards.

PROJECT SPECIFIC IMPACTS

Of primary concern is the potential for construction and operation activities associated with the proposed REP to cause take of sensitive biological resources, and the degradation, loss and fragmentation of biological communities.

Power Plant and Laydown Areas

RE originally proposed a 50-acre project site (Table 8.2-5, Biological Resources, Roseville 2003a), but the project's construction zone was redesigned. After consultation with staff, and staff from The California Department of Fish and Game (CDFG) and the U.S. Army Corp of Engineers (USACE), RE proposed a new plan for the power plant footprint, switchyard, construction offices, and parking areas. (Roseville Electric 2004f). The new plan proposes 21.9 acres for construction of the REP (Roseville Electric 2004f). The REP footprint would occupy 10.9 acres and abut the southern end of the proposed construction zone (see **Biological Resources Figure 1**). The current plan would make use of an offsite laydown area. The 17.8-acre laydown area (Roseville Electric 2004g) would be located on the south side of Phillip Road across from the southwest corner of a 70-acre City of Roseville parcel. Acreage impact figures in the Roseville Energy Park Biological Resources Summary (Roseville Electric 2004f) and the Supplemental Information to the Project Description for the REP (Roseville Electric 2004g) do not match. It is not clear which of these documents accurately portrays project impacts to vernal pool grasslands. Staff analyzed project impacts based on the REP Mitigation Summary (Roseville Electric 2004f).

Biological resources surveys were conducted by RE during July and August 2003 (Roseville Electric 2003a). Other biological resources surveys of the proposed REP and adjacent areas were conducted for a previously proposed power plant (REF 2002). Additional sampling for vernal pool branchiopods was conducted in October 2003 (dry season). Results of dry season branchiopod surveys showed that *Branchinecta* sp. cysts were present in some pools located on the site and adjacent areas. Vernal pool fairy shrimp presence (*Branchinecta lynchi*) was confirmed during wet season presence/absence surveys conducted in December and February 2004. Swainson's hawks, northern harriers, and white-tailed kites have been observed foraging at the proposed site (Itoga, pers. obs.).

Although some of the proposed REP at the southern end is disturbed, most of the proposed site, and some adjacent areas are vernal pool grassland habitat designated by the USFWS as critical habitat for the vernal pool fairy shrimp,vernal pools/swales and adjacent vernal pool grasslands. Constructing the power plant footprint, offices, and parking areas would cause degradation, loss and fragmentation of vernal pools/swales and adjacent vernal pool grasslands vernal pool fairy shrimp habitat (Roseville Electric 2003f, Roseville Electric 2004g). Take of vernal pool fairy shrimp would be likely. In addition, lighting associated with the power plant could attract birds resulting in collisions with project infrastructure.

Constructing the office and parking areas would permanently remove features of the vernal pool landscape affecting the topography and hydrology of the site. Constructing and operating the REP would reduce the value of the vernal pool grassland ecosystem. The wetted and vernal pool grassland portions are both necessary for a healthy and functional vernal pool ecosystem. In addition to direct and indirect adverse impacts to vernal pool fairy shrimp and vernal pool fairy shrimp habitat, other sensitive species protected under the federal/state endangered species acts will be affected by construction and operation of the project. For a discussion and list of these species see direct and indirect impacts sections below.

Vernal pool grassland Impacts

Vernal pools in California tend to occur in clusters called complexes. A landscape that supports a vernal pool complex is typically grassland (vernal pool grasslands) with areas of obstructed drainage that form pools (Federal Register 2003). Maintaining the integrity of vernal pool grasslands influences not only the hydrology of vernal pools but also the likelihood of maintaining some characteristic pool fauna and interactions among species. Vernal pool grassland habitat adjacent to, and within, a vernal pool complex, or vernal pool grassland, is essential to the hydrological and biological integrity of the complex (USFWS 1996).

In assessing critical habitat for the vernal pool fairy shrimp, the USFWS determined that habitat within Unit 12 (including the REP and adjacent City property) has the physical attributes (including vernal pool grasslands) necessary for the survival and recovery of the fairy shrimp (Federal Register 2003). Viability of vernal pool ecosystems depends on maintaining more than just areas that fill with water. The vernal pool grassland component of vernal pool grassland ecosystems supports the wetland component (Smith and Verrill 1998, Hanes and Stromberg 1998, Silveira 1998), and wetlands

(including vernal pool systems) are naturally dynamic ecosystems physically bound by site-specific hydrologic and geomorphic controls. The functional properties of wetlands are determined largely by their hydrogeomorphic context (Leidy and White 1998), but in addition to their role in the form and function of the vernal pool landscape, the vernal pool grassland component of vernal pool grasslands provides other important functions.

Besides supporting the wetland component of the vernal pool grassland ecosystem, vernal pool grasslands are essential to the health of vernal pool grasslands and wildlife populations. For example, various bee species utilize vernal pool grasslands adjacent to vernal pools for nesting. Bees provide a mechanism for pollinating plants within and between vernal pool grassland, and other habitats. Vernal pool grasslands provide important foraging, roosting, and breeding habitat for raptors, waterfowl, shorebirds, and passerines. Migrating waterfowl and shorebirds utilizing vernal pool grasslands, transport dormant seeds and eggs of vernal pool organisms from one location or region to another, either internally in food, or attached in mud to their legs or feathers (Wolf et al. 1998). These types of interactions help the exchange of genetic information necessary to maintain healthy biological resource populations within vernal pool grasslands. As habitat is lost and fragmented, the exchange of genetic information between populations becomes increasingly difficult. Lack of genetic diversity can lead to population crashes and extinction.

RE indicated that 6.9 acres of raptor foraging habitat (Roseville Electric 2004f) would be permanently affected by grading and filling for the proposed power plant footprint and switchyard. RE also indicated that grading and gravelling other areas for use as office space and parking areas would temporarily affect another 4.1 acres of annual grasslands.

Natural gas pipeline alternatives A and D have been proposed. See **Biological Resources Figure 2**. Constructing the natural gas pipelines would disturb 2.6 acres and 0.0 acres respectively. The total acreage of affected vernal pool grasslands would be 14.1 acres if alternative A is constructed, and 11.5 acres if alternative D is constructed (Roseville Electric 2004f). See **Biological Resources Table 2 below**

Biological Resources Table 2
Disturbance to Vernal pool grassland Habitat

Power plant and switchyard	6.9 acres
Construction offices and parking	4.1 acres
Storm water outfall and sanitary sewer line	0.5 acre
Natural gas pipeline Alternative A	2.6 acres
Natural gas pipeline Alternative D	0.0 acre
Total vernal pool grassland disturbance (alt. A)	**14.1 acres**
Total vernal pool grassland disturbance (alt. D)	**11.5 acres**

Source: Roseville Electric 2004f.

Constructing and operating the REP would also cause the degradation, loss and fragmentation of vernal pool grassland foraging habitat used by a variety of wildlife, including the Swainson's hawk. California Natural Diversity Database (CNDDB) (CDFG 2004) records indicate that there are two active Swainson's hawk nests within the

Pleasant Grove Creek riparian area. The nests are within approximately two miles of the proposed REP. California Department of Fish and Game (CDFG) mitigation guidelines suggest replacement habitat (for nests within five miles of a project, but greater than one-mile), at a ratio of 0.75 acre for every one-acre of foraging habitat affected, or other project specific measures (CDFG 1994).

Direct Impacts

By causing the degradation, loss and fragmentation of vernal pool grassland habitat, construction and operation of the proposed REP would have direct, adverse impacts to sensitive species observed on or near the proposed project site (USFWS 1999, URS 2002, CNDDB 2003, Itoga pers obs.). Sensitive species observed on or near the REP are:

- Western spadefoot (federal and state species of concern);
- Dwarf downingia (CNPS list 2);
- Swainson's hawk (federal species of concern, state threatened);
- White-tailed kite (state fully protected);
- Northern harrier (state species of concern);
- Burrowing owl (federal and state species of concern);
- Vernal pool fairy shrimp (federally threatened);
- Horned lark (state species of concern); and
- Ferruginous hawk (federal and state species of concern).

Indirect Impacts

Also protected under the federal/state endangered species acts are some species that could potentially occur on the proposed project site. Although no observations of the species have been recorded in the California Natural Diversity Database (CNDDB), suitable habitat exists on the site to support them. Species potentially affected indirectly by construction and operation of the REP are:

- Stinkbells (federal species of concern, CNPS list 4);
- Bogg's Lake hedge hyssop (federal species of concern, state endangered, CNPS list 1B);
- Red Bluff dwarf rush (federal species of concern, CNPS list 1B);
- Pincushion navarretia (federal species of concern, CNPS list 1B);
- Legenere (federal species of concern, CNPS list 1B);
- Big-scale balsamroot (federal species of concern, CNPS list 1B);
- Lawrence's goldfinch (federal species of concern);
- Cooper's hawk (state species of concern);
- Western pond turtle (federal and state species of concern);
- Vernal pool tadpole shrimp (federal endangered); and

- California tiger salamander (federal threatened and state threatened).

REP construction and operation would reduce the amount of potential habitat, create smaller segmented patches of habitat, and degrade the quality of potential habitat available to these species.

RE has proposed to restore vernal pool grasslands separate from wetted acres. The loss would be a vernal pool grassland ecosystem. The replacement compensation must be the same. Staff proposes no-net-loss of vernal pool grassland ecosystem function and value. RE's proposal to restore vernal pool grasslands separate from the wetted acres would not replace the functioning vernal pool grassland ecosystem, or its value to wildlife because:

- disturbed areas classified as temporarily affected would be unavailable for use by wildlife during construction (18 months-two years) and the time required to restore the habitat (minimum one-year for revegetation and staff performance criteria is typically five years);
- constructing natural gas pipeline alternative A would penetrate the hardpan/duripan layer beneath the REP construction area, compromising the hydrological characteristics of the vernal pools/swales within the 70-acre City property;
- natural gas pipeline alternative A proposed for vernal pool grassland restoration is also the proposed route for the Phillip Road extension (see Cumulative Impacts section);
- impacts to existing plant and animal populations would not be mitigated by replacement of only one component of the complex vernal pool grassland ecosystem located on the proposed REP and adjacent areas;
- because of the proximity of the proposed power plant to areas proposed for restoration, it is not likely that on-site restoration of vernal pool grassland habitat could be effectively managed (e.g. controlled burns, cattle grazing) for the preservation/recovery of any of the sensitive species directly, indirectly or cumulatively affected by the REP. Also the full function of the system could not be maintained for the life of the project in such close proximity to an operating powerplant with associated noise and activity;
- the office space/parking area proposed for restoration will be used for two recycled water tanks associated with the WRSP (Roseville Electric 2004f, also see Cumulative Impacts section);
- constructing and operating the proposed power plant, construction office/parking areas and natural gas pipeline would permanently alter the topography of the proposed site and the hydrology of some adjacent areas; and
- constructing and operating the proposed REP would modify the existing vernal pool grassland and create more edge habitat. This would leave islands of reduced quality habitat available for plants and animals. This fragmentation of a sensitive ecosystem would contribute to reduced exchange of genetic information between local populations, loss of biological resource value, and a general degradation of the ecosystem.

For the aforementioned reasons, and after informal consultations with staff from CDFG (J. Finn pers. comm.), and USFWS (R. Kuyper pers. comm.), staff concluded that impacts to vernal pool grasslands associated with construction of the proposed REP construction office/parking areas are not temporary. Proposed construction and operation activities associated with the office space and parking areas would have direct, indirect, and cumulative adverse impacts to vernal pool grassland habitat. If RE constructs alternative gas pipeline A, impacts to vernal pool grasslands would be 14.1 acres. If RE constructs alternative gas pipeline D, impacts to vernal pool grasslands would be 11.5 acres. However, staff has proposed Biological Resources Condition of Certification **BIO-13, BIO-14** and **BIO-15** to mitigate potential vernal pool grassland impacts to levels less than significant.

Wetted acre Impacts

Essential to the vernal pool grassland ecosystem are the wetted portions (pools and swales). RE's wetland delineation has not been verified by the U.S. Army Corp of Engineers (USACE). The verified delineation will be used to calculate the project's potential impacts to wetlands under USACE jurisdiction and start the formal consultation process with the USFWS.

Will Ness (USACE staff) contacted staff to report that unauthorized construction activities occurred on the REP site (W. Ness pers. comm.). USACE staff indicated that the activities were associated with the PGWWTP and could disqualify the REP for a Nationwide permit. Resolving this issue has delayed USACE verifying the wetland delineation and USACE permitting of the REP.

Prior to being notified by USACE that unauthorized activities occurred on the REP site, RE redesigned the REP construction plan and submitted a new delineation and Biological Assessment (BA). USACE staff has not verified any REP wetland delineation, so staff reviewed the September 2004 revised delineation for impacts to fairy shrimp habitat and waters of the U.S. (Roseville Electric 2004d).

RE calculated direct impacts to wetted fairy shrimp habitat for constructing and operating the REP with natural gas pipeline alternatives A and D. Natural gas pipeline alternative D would avoid direct impacts to water 01 and DRN 1, 2, and 3 (not fairy shrimp habitat), P5, wet 39, 40 and 51 (fairy shrimp habitat) and indirect impacts to Area A (see **Biological Resources Figure 3**). Area A would still be within 250 feet of the REP construction zone and would be indirectly affected by constructing and operating the REP power plant site.

Constructing gas pipeline alternative A would indirectly affect the entire area A. Area A is one large, continuous pool swale area. Constructing the REP power plant footprint would also occur within 250 feet of area A and would have the same indirect affects. The wetted acreage affected would be similar whether affected by constructing gas pipeline alternative A or the power plant footprint. Eliminating proposed natural gas pipeline alternative A would avoid indirect impacts to .10 acres of wetted vernal pool fairy shrimp habitat. Impacts to waters of the U.S. that are not vernal pool fairy shrimp habitat would also be avoided.

Staff repeatedly discussed the definition of direct and indirect impacts associated with vernal pool fairy shrimp habitat with RE at workshops and in telephone conversations. USFWS staff also explained the definition of direct and indirect impacts and how they apply to Area A at workshops and in an email to Eric Htain (Kuyper 2004).

Staff reviewed the impact assessment and calculated the wetted acre impacts associated with construction of the REP using alternatives A and D. See **Biological Resources Tables 3 and 4 below**.

Biological Resources Table 3
Wetted Acre Impacts Alternative A

Direct Impacts	Indirect Impacts
Footprint, offices and parking = 0.5 acre	Footprint, offices and parking = 0.8 acre
	Natural Gas Pipeline = 1.7 acres
Total direct impacts = 0.5 acre	**Total indirect impacts = 2.5 acres**
Mitigation ratio = 2:1 preservation and 1:1 creation	**Mitigation ratio = 2:1 preservation**

Source: Roseville Electric 2004d, 2004f.

Biological Resources Table 4
Wetted Acre Impacts Alternative D

Direct Impacts	Indirect Impacts
Footprint offices and parking = 0.5 acre	Footprint, offices and parking = 2.4 acres
Total direct impacts = 0.5 acre	**Total indirect impacts = 2.4 acres**
Mitigation ratio = 2:1 preservation and 1:1 creation	**Mitigation ratio = 2:1 preservation**

Source: Roseville Electric 2004d, 2004f.

It is apparent from site visits, informal consultations with USFWS (R. Kuyper pers. comm., K. Fuller pers. comm.) and USACE (J. Cutler pers. comm., W. Ness pers. comm.) staff, and review of wetland delineations, that the REP and the remainder of the 70-acre City property are hydrologically connected. Pools designated separately (see **Biological Resources Figure 1)** as wet 22, 42, 46, 48, and 50 (Roseville 2004a) are one continuous pool (area A). Because portions of area A, would be indirectly impacted by construction of the natural gas pipeline, and because area A is one continuous pool, the entire wetted area A would be indirectly impacted (Nagano 2001).

Vernal pools/swales are fairy shrimp habitat, and vernal pools/ swales are subsets of wetlands. Areas defined as seasonal wetlands by RE, are fairy shrimp habitat. In staff's opinion the 70-acre City property (including the REP) is fairy shrimp habitat. The USFWS verified this assessment in an email communication to Eric Htain (Kuyper 2004).

The proposed REP and adjacent areas are within USFWS designated critical habitat for the vernal pool fairy shrimp. The REP is included in Unit 12 (West Placer Unit) of the critical habitat designated for vernal pool species. Unit 12 includes portions of the cities

of Citrus Heights, Gold Hill, Lincoln, Pleasant Grove, Rio Linda, Rocklin, Roseville, and Sheridan. The main species of concern for Unit 12 is the vernal pool fairy shrimp. The USFWS determined that habitat within Unit 12 (including the proposed REP and 70-acre City property) has the physical attributes necessary for the survival and recovery of the fairy shrimp (Federal Register 2003).

Vernal pools usually exist in complexes and may be fed or connected by low drainage pathways called swales. Swales are often themselves seasonal wetlands that remain saturated for much of the wet season, but may not be inundated long enough to develop strong vernal pool characteristics (Federal Register 2003). Water is retained in pools and swales because of underlying layers of impermeable material such as: claypan, hardpan, or non-volcanic rock (Chetham 1976, Weitkamp et al. 1996). Pool and swale inundation occurs in winter and/or spring with desiccation beginning once the rainy season is over (late spring and early summer). Variations in rainfall affect the duration of pools and swales (vernal pool complexes may undergo more than one cycle of inundation and desiccation in a single season).

Dry season sampling was conducted to determine if *Branchinecta* cysts were present on the proposed project site. *Branchinecta* sp. cysts were present in 11 of 30 (37 percent) basins sampled on the proposed project site and some adjacent areas.

Cysts are the dormant life stage of vernal pool branchiopods (a classification which includes the vernal pool fairy shrimp). The cysts are able to withstand extreme environmental conditions enabling them to remain viable for many years. Although exact environmental cues necessary to trigger hatching of fairy shrimp cysts are unknown, it is known that a limited temperature range and inundation of habitat are two factors that are needed for hatching to begin. Cysts usually begin hatching in late winter and continue into late spring. Fairy shrimp habitat may dry out and become inundated more than once in a single season, and fairy shrimp cysts can hatch during any appropriate cycle of inundation (Eriksen and Belk 1999).

RE collected cysts and identified them to genus level. Cysts were not cultured to allow identification to species level. Instead, wet season surveys were conducted by RE on December 23, 2003, and January 6, 20, and 27, 2004. Results of wet season sampling indicated that vernal pool fairy shrimp (*Branchinecta lynchi*) were present in P1, east of the PGWWTP lift station at the southeast corner of the 70-acre City parcel (see **Biological Resources Figure 1**). The wet season survey was conducted to establish presence or absence of vernal pool fairy shrimp on the proposed project site and adjacent City of Roseville property (Helm pers. comm.).

Staff considers the REP and 70-acre City parcel to be vernal pool fairy shrimp habitat because:

- the REP and adjacent 70-acre City property are hydrologically connected vernal pool grassland habitat;
- there are historical records of vernal pool fairy shrimp documented close to the proposed project site (at the PGWWTP and north of the REP);
- it is designated as critical habitat for vernal pool fairy shrimp;

- *Branchinecta* sp. cysts were found in 37 percent of basins sampled on the REP site;
- staff assessed the habitat on the proposed project site and concluded it is fairy shrimp habitat;
- staff from CDFG (J. Finn pers. comm.), USFWS (R. Kuyper pers. comm.), and USACE (W. Ness pers. comm.) agree that the 70-acre City property (including the REP) is vernal pool fairy shrimp habitat; and
- *Branchinecta lynchi* presence was confirmed immediately adjacent to the proposed REP within the 70-acre City property (see wetlands P1 and P2 Biological Resources Figure 1).

Staff concludes that constructing and operating the proposed REP would result in vernal pool fairy shrimp habitat degradation, loss and fragmentation. Grading and filling activities proposed for the REP power plant footprint, office, and parking areas and would cause direct adverse impacts to 0.5 wetted acres of vernal pool fairy shrimp habitat, and indirect adverse impacts to 2.5 wetted acres of vernal pool fairy shrimp habitat. Alternative D would result in indirect impacts to 2.4 wetted acres. In addition, take of vernal pool fairy shrimp is likely. Staff has proposed Biological Resources Condition of Certification **BIO-13**, **BIO-14** and **BIO-15** to reduce potential impacts to vernal pool fairy shrimp, and vernal pool fairy shrimp habitat to levels less than significant.

Linear Facilities

Natural Gas Pipeline

RE's proposed natural gas pipeline alternative A that would originate from a Pacific Gas and Electric pipeline near Country Club Drive. The pipeline would be approximately 6 miles long. It would be routed beneath Baseline Road to the east before being routed north beneath Fiddyment Road. At the intersection of Fiddyment Road and Blue Oaks Boulevard, the pipeline would be routed generally west across what is currently open space. Construction of the pipeline within this open-space area would impact vernal pool grasslands, riparian areas and would require crossings of Curry and Kaseberg Creeks. There would also be crossings of unnamed tributaries to Pleasant Grove and Kaseberg Creeks. Impacts associated with construction and operation of the gas pipeline from the end of existing Blue Oaks Boulevard to the eastern boundary of the 70-acre parcel owned by the City of Roseville were analyzed during the WRSP review process, but at the time the REP application was submitted, only a draft 404 permit had been issued by the USACE (W. Ness pers. comm.). A final 404 permit will be needed before construction could begin.

The natural gas pipeline would enter the 70-acre City property on the east side. It would continue west approximately 800 feet, south for approximately 1,200 feet, and then east again for approximately 600 feet before terminating at the proposed REP (see **Biological Resources Figure 1**).

Staff and USFWS staff consulted with RE on the indirect impacts associated with REP natural gas pipeline alternative A. Staff and USFWS staff indicated that when construction activities occur within 250 feet of a vernal pool/swale the pool/swale would

be indirectly affected. This is due to a variety of factors including changes to site hydrology associated with disturbances to adjacent vernal pool grasslands and disturbance to the layer of hardpan/duripan beneath the vernal pool grassland. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonable certain to occur. Vernal pools/swales can be affected by indirect effects that result in changes in hydrology, introduction of pollutants, erosion, and human-related disturbance (USFWS 1999).

Construction of the alternative A gas pipeline would have adverse direct and indirect affects on 1.7 wetted acres of vernal pool fairy shrimp habitat. Staff has proposed Biological Resources Condition of Certification **BIO-13, BIO-14** and **BIO-15** to mitigate impacts to less than significant.

RE also proposed alternative natural gas pipeline D. This pipeline would be 1.6 miles long. It would be routed north from Pleasant Grove Boulevard, to Phillip Road. The pipeline would then be routed west for approximately 1100 feet before being routed beneath Phillip Road to the proposed REP.

Constructing the alternative A natural gas pipeline would have a direct adverse impact on 1.6 acres of vernal pool grassland habitat (excluding wetted acres). Vernal pool grassland ecosytems provide habitat for a variety of sensitive wildlife species. Staff considers impacts associated with constructing the natural gas pipeline permanent Staff has proposed Biological Resources Condition of Certification **BIO-13, BIO-14** and **BIO-15** to mitigate these impacts to levels less than significant.

Constructing natural gas pipeline alternative D would avoid impacts to some waters of the U.S. (water 01,DRN3) that are not vernal pool fairy shrimp habitat **See Biological Resources Figure 3**. Alternative D would not affect vernal pool fairy shrimp habitat Area A. Impacts to biological resources outside the City property have been considered for the WRSP. Constructing alternative D would not impact any additional vernal pool grassland not already affected by constructing the power plant foot print and switchyard. Staff has proposed Biological Resources Condition of Certification **BIO-13, BIO-14** and **BIO-15** to mitigate these impacts to less than significant.

Transmission Line

RE indicated that the proposed REP would connect with a 60 kV double-circuit transmission line after annexation of West Roseville.

To connect the proposed REP to the 60 kV double-circuit transmission line, RE proposes a 100-foot long, 60 kV transmission line. The proposed transmission line would be constructed entirely within the REP switchyard (Roseville 2003a). The proposed switchyard would occupy 1.8 acres on the southeast side of the REP (See staff's analysis of the power plant and laydown Areas).

Staff concluded that adverse impacts to biological resources would be caused by construction of the switchyard, and proposed Conditions of Certification **BIO-13, BIO-14** and **BIO-15** to mitigate potential impacts to levels less than significant.

RE indicated (Roseville 2003a) that the transmission line towers would be constructed using Public Utilities Commission (PUC) rules for overhead line construction (PUC 1981). Staff reviewed the proposed tower designs and concluded that the proposed towers would meet Avian Power Line Interaction Committee (APLIC) standards for preventing bird electrocutions (APLIC 1996) and that bird electrocutions are unlikely.

Staff also assessed the potential for bird collisions with the proposed REP transmission line. The transmission line would be constructed within the proposed REP switchyard with towers approximately 65 feet tall. These towers would be the tallest structures associated with the REP transmission line. Avian collisions with these structures are possible; however, a height of 65 feet is considered relatively low risk for bird collisions. Raptors have been observed foraging over the proposed site, but it does not appear to be in the flight path of migratory birds.

Because the proposed transmission line would be constructed to APLIC standards for preventing bird electrocutions, staff concludes that the proposed transmission line would not pose a significant risk of electrocution to birds in the proposed project area. Staff also concludes that the proposed transmission line does not pose a significant collision hazard to birds in the proposed project area.

Recycled Water Pipeline

For cooling and process water, REP will use tertiary treated wastewater obtained from the PGWWTP. To supply the wastewater, a pipeline connecting the REP to the PGWWTP has been proposed. The proposed pipeline would be 0.1-mile long and would be routed beneath Phillip Road. The PGWWTP has been permitted and is operational. Because the PGWWTP is an already disturbed area, staff does not anticipate any adverse impacts to biological resources on the PGWWTP site.

From the PGWWTP site, the proposed pipeline would be routed beneath an existing section of Phillip Road. Staff considers this paved surface of little value to wildlife. Staff does not anticipate any adverse impacts to biological resources associated with constructing the recycled water pipeline beneath Phillip Road.

Sanitary Sewer Pipeline

RE proposed 800 feet of sanitary sewer pipeline to connect the proposed project to the PGWWTP lift station. The sanitary sewer line would traverse the southern border of the REP site paralleling Phillip Road. The proposed line would extend approximately 250 feet outside of the proposed REP site. The proposed pipeline would traverse mostly disturbed areas. Wet 35 (**see Biological Resources Figure 1**) would be directly affected by pipeline construction. Staff discusses impacts to Wet 35 in the power plant and laydown areas section. The terminal end of the pipeline would extend past the proposed REP construction zone and impact 0.1 acre of vernal pool grassland. Staff has proposed Biological Resources Conditions of Certification **BIO-13, BIO-14** and **BIO-15** to reduce impacts to less than significant.

Stormwater Outfall

RE proposed a 720-foot stormwater outfall as part of the proposed project. The proposed outfall would be routed east from the northeast corner of the power plant

footprint to its discharge point, an unnamed north-south tributary to Pleasant Grove Creek. Most of the proposed outfall route would traverse areas that are disturbed or would be impacted by other project infrastructure. Most of the impacts to the vernal pool grassland ecosystem associated with construction of the outfall have been considered in the Power Plant and Laydown Areas sections. The terminal end of the outfall would impact 0.4 acres of vernal pool grasslands. The discharge end of the outfall would adversely affect an unamed tributary to Pleasant Grove Creek. Staff has proposed Biological Resources Conditions of Certification **BIO-8, BIO-9, BIO-11**, **BIO-13**, **BIO-14** and **BIO-15** to reduce impacts to levels less than significant. If these conditions are complied with, staff does not anticipate any adverse impacts associated with constructing the stormwater outfall.

CUMULATIVE IMPACTS

Cumulative impacts refer to two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. A project may have a significant cumulative impact even though the project's individual contribution may be minor. The cumulative impact of several projects is the change in the environment that results from the incremental impact of the project when added to other, closely related past, present, or reasonably foreseeable, probable future projects.

The population of Placer County is rapidly increasing. It is estimated that between the years 2000 and 2025, the population of southern Placer County will double, and by 2025 total employment in southern Placer County is projected to exceed total employment in downtown Sacramento (Federal Register 2003a). Past and present development projects have impacted regional biological resources, and as population and employment increase, it seems reasonable to assume that development projects will also increase, and impacts to regional biological resources will continue.

The proposed REP would contribute incrementally to the degradation, loss and fragmentation of sensitive biological resources, including designated critical habitat for the vernal pool fairy shrimp. Staff considers REP's incremental contributions to the impact of sensitive biological resources to be significant.

The City of Roseville approved the West Roseville Specific Plan (WRSP) that annexed 5,527 acres west of the City of Roseville and placed it within the City's boundaries. The WRSP did not include proposals to develop 2,365 acres at this time, but development is likely to occur at some time in the future. Staff was notified that 12 subdivision maps had been submitted by October 2004 for the first phase of build-out. The WRSP proposes conversion of approximately 3,162 acres of open-space to a mixture of high and low density housing, light industrial, parks, schools, and open-space. Implementing the WRSP would affect a variety of biological resources, and mitigation measures were included to address concerns of the USFWS, USACE, and CDFG.

The road extensions (linears) and water tanks associated with the WRSP would contribute to degradation, loss and fragmentation of vernal pool grassland on the REP and 40-acre City property. The Phillip Road extension would bisect the proposed REP project site on the east side, traversing the site in a north-south direction. The REP

natural gas pipeline would be constructed along the same route as the proposed Phillip Road extension. Restoring vernal pool grasslands disturbed while constructing the natural gas pipeline would not benefit wildlife or habitat if the same vernal pool grasslands proposed for restoration are also proposed as the site for WRSP road construction. Another area proposed for restoration (REP office space and parking), is also proposed for WRSP water tanks.

- Because of the incremental contributions of projects in the immediate vicinity of the proposed REP, and the similarity in the species affected, or potentially affected, it is staff's opinion that the proposed REP would contribute incrementally and cause significant adverse cumulative impacts to vernal pool grasslands, and the following species known from the proposed project area:
- Western spadefoot (federal and state species of concern);
- Dwarf downingia (CNPS list 2);
- Swainson's hawk (federal species of concern, state threatened);
- White-tailed kite (state fully protected);
- Northern harrier (state species of concern);
- Burrowing owl (federal and state species of concern);
- Vernal pool fairy shrimp (federally threatened);
- Golden eagle (state fully protected);
- Horned lark (state species of concern); and
- Ferruginous hawk (federal and state species of concern).

In addition, the proposed REP would also cause adverse cumulative impacts to the following species with potential to occur in the proposed project area:

- Stinkbells (federal species of concern, CNPS list 4);
- Bogg's Lake hedge hyssop (federal species of concern, state endangered, CNPS list 1B);
- Red Bluff dwarf rush (federal species of concern, CNPS list 1B);
- Pincushion navarretia (federal species of concern, CNPS list 1B);
- Legenere (federal species of concern, CNPS list 1B);
- Big-scale balsamroot (federal species of concern, CNPS list 1B);
- Lawrence's goldfinch (federal species of concern);
- Cooper's hawk (state species of concern);
- Bald eagle (state endangered);
- Western pond turtle (federal and state species of concern);
- Vernal pool tadpole shrimp (federal endangered); and
- California tiger salamander (federal candidate for listing, state species of concern).

Because of the similarities in the sensitive biological resources affected by PGWWTP and the WRSP, and when considered together with impacts associated with the proposed REP, staff concludes that the proposed REP would cause significant adverse cumulative impacts, and has proposed Biological Resources Conditions of Certification **BIO-13, BIO-14** and **BIO-15** to reduce these significant cumulative impacts to levels less than significant.

MITIGATION

RE proposed general mitigation measures for potential impacts to Central Valley steelhead, chinook salmon, vernal pool crustaceans, dwarf downingia, western spadefoot, Swainson's hawk, and white-tailed kite. In addition, RE proposed habitat compensation for potential impacts to vernal pool fairy shrimp habitat, Swainson's hawk and white-tailed kite. Staff agrees with the general mitigation measures (trash removal, Best Management Practices etc.) proposed by RE (Roseville 2003a).

The proposed project would cause the destruction of USFWS designated critical habitat for vernal pool fairy shrimp within West Placer Unit 12. Critical habitat is a specific geographic area essential for the conservation of a federally listed threatened or endangered species and may require special management or protection (Endangered Species Act 1973). In designating Unit 12 as critical habitat, the USFWS determined that habitats within Unit 12 boundaries (including the proposed project site) possess the appropriate combination of climate, soil, and topography, over continuous areas, (within western Placer County), to support the survival and recovery of vernal pool fairy shrimp (Federal Register 2003).

Because vernal pool fairy shrimp critical habitat within Unit 12 would be adversely impacted by the proposed project, habitat compensation lands must have characteristics similar (i.e. climate, soil, topography) to Unit 12 habitat. In addition, because take of the vernal pool fairy shrimp is likely, any replacement habitat should have vernal pool fairy shrimp present. RE indicated that impacts to vernal pool fairy shrimp could not be avoided, and on-site mitigation is not desirable or possible due to the City's future development plans. Providing habitat within Unit 12 would be preferred, but suitable vernal pool grassland habitat near Unit 12 would be acceptable.

The USACE usually requires creation of wetlands separate from mitigation required by USFWS. The USACE has not indicated what mitigation will be required for fill of jurisdictional waters.

Once it is determined that potential impacts are fully mitigated, the USFWS would issue an incidental take permit to the project owner. The USACE regulates wetland fill and enforces a no net-loss of wetlands policy. Informal consultation with the USACE (W. Ness pers. comm.) indicated that the wetted acres on the proposed project site, and adjacent City of Roseville property are jurisdictional wetlands.

Although the wetted acreage amounts will be the same if they are defined as fairy shrimp habitat or seasonal wetlands, mitigation required by USFWS and USACE will differ. To satisfy USACE requirements, wetlands will need to be created. To create

these wetlands, RE will need a suitable parcel to create functional and viable vernal pool habitat.

Some vernal pool impacts in Placer County have been mitigated by buying credits in a mitigation bank. Development projects in Placer County have exhausted the supply of vernal pool bank credits. No new vernal pool mitigation banks are planned for Placer County. The USFWS and USACE sometimes allow impacts to vernal pool fairy shrimp and vernal pools (respectively) to be mitigated through in-lieu fee programs if there are no other viable options.

One benefit of vernal pool mitigation bank preservation credits is that habitat within the mitigation bank is a functioning system with adjacent vernal pool grasslands intact. Mitigating vernal pool impacts (based on wetted acres) outside of an USFWS/USACE approved bank would not preserve sufficient vernal pool grasslands needed for a functional, viable vernal pool grassland ecosystem. REP will need to replace the vernal pool grassland ecosystem affected by the project with a similar vernal pool grassland ecosystem.

APPLICANT PROPOSED HABITAT COMPENSATION

RE proposes to pay into the USFWS species fund to mitigate impacts to wetted vernal pool fairy shrimp/habitat. For direct impacts to 0.5 acres pay fees for preservation of 1.0 acre of habitat (2:1) and 0.5 acre of creation (1:1). For indirect impacts to 3.0 acres, pay into the USFWS species fund to preserve 6.0 acres of vernal pool fairy shrimp habitat (2:1). **See Biological Resources Table 5 below**.

RE Proposed Wetted Acre Compensation, Alternative A
Biological Resources Table 5

Wetted acre preservation	**Wetted acre creation**
Plant footprint, offices, parking **= 0.5 acre (direct impact)***	Plant footprint, offices, parking = **0.5 acre (direct impact)*** **0.5 acre @ 1:1 = 0.5 acre (direct impact)**
Plant footprint, offices, parking = **0.8 acre (indirect impact)**** Natural gas pipeline = **1.7 acres (indirect impact)**** **0.5 (direct) + 1.7 (indirect) + 0.8 (indirect) = 3.0 acres** **3.0 acres @ 2:1 = 6.0 acres (indirect impacts)**	
Total direct and indirect impacts **preservation = 6.0 acres**	**Total** direct impact **creation = 0.5 acre**

RE Proposed Wetted Acre Compensation, Alternative D
Biological Resources Table 6

Wetted acre preservation	Wetted acre creation
Plant footprint, offices, and parking = **0.4 acre (direct impact)***	Plant footprint, offices, and parking = **0.4 acre** **0.4 acre @ 1:1 = 0.4 acre (direct impact)**
Plant footprint, offices, and parking = **1.9 acres (indirect impact)**** Natural gas pipeline = 0.0 acre **0.4 (direct) + 1.9 acres (indirect) = 2.3 acres** **2.3 acres @ 2:1 = 4.6 acres (indirect impacts)**	
Total direct and indirect impacts **preservation = 4.6 acres**	**Total** direct impact **creation = 0.4 acres**

Source: Roseville 2004f.
* Direct impacts require preservation and creation at 3:1 (2:1 preservation and 1:1 creation).
** Indirect impacts require preservation only (2:1 preservation).

As illustrated in **Biological Resources Tables 5 and 6,** RE proposes paying into the USFWS species fund to preserve 6.0 acres of wetted habitat (direct and indirect impacts) for alternative A and 4.6 acres for alternative D. For direct impacts RE proposes to pay fees to create 0.5 acre of vernal pools for alternative A and 0.4 acres for alternative D. Total wetted impact acreage would be 6.5 acres for alternative A and 5.0 acres for alternative D.

Vernal pool grasslands

In addition to wetted fairy shrimp habitat compensation, RE indicated that a total of 21.9 acres of vernal pool grasslands would be affected by the project. Of the 21.9 acres, approximately 7.8 acres is already disturbed habitat. RE proposed to provide compensation for 6.9 acres of Swainson's hawk and white-tailed kite foraging habitat. RE proposed restoring 7.2 acres of vernal pool grasslands. RE proposed the aforementioned vernal pool grassland mitigation for both alternatives A and D (Roseville Electric 2004f).

Staff Proposed Habitat Compensation

The entire vernal pool ecosystem must be preserved, not split into two components. The vernal pools/swales and the vernal pool grasslands are essential for the form and function of the vernal pool grassland ecosystem. Staff reviewed the wetland delineation for the latest REP construction plan (Roseville Electric 2004d). Staff reviewed the impact assessment for alternative D. Staff's analysis of acreage impacts is different than figures resulting from RE's analysis (Roseville Electric 2004f) see **Biological Resources Tables 2-4** for staff's impact acreages.

Staff requires that mitigation be in place prior to ground disturbing activities or that a third party entity has received mitigation funds and is actively seeking habitat to purchase. The USFWS does not have the resources to actively search for high quality habitat to purchase and manage with in-lieu funds, so it is not likely that the mitigation would be in place prior to site disturbance or that an active search for habitat compensation would occur in the near future.

The cost for mitigating vernal pool fairy shrimp wetted acre habitat impacts through the USFWS species fund is $135,000 dollars per acre (K. Fuller, S. Hill pers.comm.). The $135,000 dollar fee includes the cost of purchasing one-acre, and the funds to manage the one-acre in perpetuity.

Center for Natural Lands Management (CNLM) staff has indicated it would be willing to locate, acquire and manage high quality vernal pool grassland habitat to satisfy the REP mitigation requirements. The task would include the location and acquisition of both wetted and vernal pool grassland components of the vernal pool grassland ecosystem. A suitable parcel would either have the potential for future expansion as a vernal pool grassland preserve, or be located adjacent to an existing vernal pool grassland preserve. Another similar non-profit organization with experience locating, purchasing, and managing mitigation lands for biological conservation value can be used. Staff has previously worked with CNLM and has confidence in their ability and dedication.

Staff visited Reason Farms on October 14, 2004 and assessed habitat proposed by RE as compensation for vernal pool grassland ecosystem lost due to REP construction and operation. Staff found the habitat to be unacceptable as compensation for impacts to a vernal pool grassland ecosystem. The area provides extremely marginal resources to support any species potentially affected by the REP including Swainson's hawk. This habitat would not replace the vernal pool ecosystem impacted by the REP.

CDFG guidelines suggest mitigation for impacts to nesting Swainson's hawks for projects within 5 miles but greater than 1 mile from an active nest. The guidelines suggest replacement habitat at 0.75 acre of high quality foraging habitat for every 1 acre affected. The guidelines also suggest that project specific measures may also be applied. The vernal pool grassland habitat is not simply foraging habitat for the Swainson's hawk and white-tailed kite. The vernal pool grasslands on the site are part of a larger functional vernal pool ecosystem. Replacing only the vernal pool grassland component of this hydrologically connected ecosystem would not replace what would be affected and lost.

Because of the number of species that would or could potentially be directly and indirectly affected by the degradation, loss and fragmentation of vernal pool grasslands on the proposed REP, staff agrees with the 1:1 ratio proposed by RE (Roseville Electric 2004b), but proposes RE provide 14.1 acres (for alternative A, or 11.5 acres for alternative D) of vernal pool grassland habitat adjacent to wetted vernal pool grassland habitat and suitable to support:

- Swainson's hawk (federal species of concern, state threatened);
- White-tailed kite (state fully protected);
- Northern harrier (state species of concern);
- Burrowing owl (federal and state species of concern);
- Golden eagle (state fully protected);
- Horned lark (state species of concern);
- Ferruginous hawk (federal and state species of concern).
- Stinkbells (federal species of concern, CNPS list 4);

- Bogg's Lake hedge hyssop (federal species of concern, state endangered, CNPS list 1B);
- Red Bluff dwarf rush (federal species of concern, CNPS list 1B);
- Pincushion navarretia (federal species of concern, CNPS list 1B);
- Legenere (federal species of concern, CNPS list 1B);
- Big-scale balsamroot (federal species of concern, CNPS list 1B);
- Lawrence's goldfinch (federal species of concern);
- Cooper's hawk (state species of concern); and
- Bald eagle (state endangered).

Staff proposes that RE allow CNLM (or other acceptable non-profit conservation organization) to search for and acquire the wetted acres and the vernal pool grassland component of the vernal pool grassland ecosystem that would be affected by constructing the REP. CNLM staff indicated that a fee sufficient to cover the cost of searching and acquiring both vernal pool grassland and wetted acre components of the vernal pool grassland ecosystem habitat compensation would be needed.

Staff prefers protection of functioning high quality vernal pools/swales instead of creation. Preservation of remaining vernal pool grassland ecosystems is more important than attempting to create ecosystems that have evolved over thousands of years. Staff proposes that instead of creating wetlands to fulfill the mitigation for REP direct impacts, RE preserve an additional 0.5 acres of vernal pool grassland ecosystem. See **Biological Resources Table 6**.

Staff proposes that RE enter into an agreement with CNLM (or other acceptable non-profit conservation organization) to locate, acquire, and manage a vernal pool grassland parcel of at least 20.6 acres with a minimum of 6.5 wetted acres (alternative A), or 17.8 acres with a minimum of 6.3 wetted acres (alternative D). This habitat should be located adjacent to an existing or future preserve or conservation area or establish a new large conservation area (100 acres or more) rich in vernal pool ecosystem resources.

If a suitable parcel to be approved by the Energy Commission Compliance Project Manager is not located within six months of the Commission Decision, the fee of $135,000 dollars per acre ($135,000 X 20.6 acres for alternative A, or $135,000 X 17.8 acres for alternative D) will be deposited into the USFWS in-lieu fund.

Vernal Pool Grassland Compensation, Alternative A
Biological Resources Table 7

14.1 acres @ 1:1 = 14.1 acres (direct, indirect, cumulative impact)
0.5 acres @ 3:1 = 1.5 acres (direct impact, wetted)
2.5 acres @ 2:1 = 5.0 acres (indirect impact, wetted)
Total wetted acre preservation = 6.5 acres
Total vernal pool grassland habitat preservation = 20.6 acres

Vernal Pool Grassland Compensation, Alternative D
Biological Resources Table 8

11.5 acres @ 1:1 = 11.5 acres (direct, indirect, cumulative impact)
0.5 acres @ 3:1 = 1.5 acres (direct impact, wetted)
2.4 acres @ 2:1 = 4.8 acres (indirect impact, wetted)
Total wetted acre preservation = 6.3 acres
Total vernal pool grassland habitat preservation = 17.8 acres

COMPLIANCE WITH LORS

The USACE has not verified RE's wetland delineation, and formal consultation with USFWS has not been initiated. Because the wetland delineation has not been verified, RE cannot submit an application for a 404 Clean Water Act permit to the USACE. Without an application to the USACE, formal federal endangered species act section 7 consultation with the USFWS can not begin. Because LORS compliance can not be determined at this time, staff is recommending **BIO 11**, that requires proof of compliance prior to the start of site mobilization activities.

Staff anticipates all other LORS to be in compliance.

FACILITY CLOSURE

Sometime in the future, the REP will experience either a planned closure, or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. 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 (CPM). Facility Closure mitigation measures will also be included in the Biological Resources Mitigation Implementation and Monitoring Plan prepared by the applicant.

The restoration of vernal pool grassland ecosystem (vernal pool grasslands, seasonal wetlands and vernal pools/swales) on the proposed project footprint will need to be addressed in any discussion of facility closure. Habitat restoration plans should include such tasks as the removal of all structures and the immediate implementation of habitat restoration measures to establish conditions extant at the time of project application.

Staff does not have any biological resource facility closure recommendations in the event of an unexpected temporary closure of the REP. However, in the event that the Energy Commission CPM decides that the facility is permanently closed, the facility

closure measures provided in the on-site contingency plan and Biological Resources Mitigation Implementation and Monitoring Plan would need to be implemented.

RESPONSES TO APPLICANT'S COMMENTS

RE-1 *Table 1 – Special Status Species. The table indicates a "high" likelihood for the giant garter snake to occur at the REP. Giant garter snakes, however, are an aquatic species that, in the Sacramento Valley prefer irrigation and drainage ditches, rice paddies, and oxbow lakes. Habitat requirements include adequate water spring through fall, when the snakes are active, and wetland vegetation such as cattails and rushes. The REP has no such features and nearby watercourses are dry for much of the year. Though there are rice fields in the general vicinity, the nearest rice field is more than 0.5 miles from the REP. The species should therefore be removed from this table.*

The likelihood of some other species in the table to be present at or near the REP is very low that they should be removed from the table. These include particularly fish such as the Chinook salmon, Delta smelt, longfin smelt, steelhead, river lamprey, Pacific lamprey, and Green sturgeon.

Staff Response. The title of Table 1 is Special Status Species Evaluated for the REP. The key word in the title is Evaluated. The table indicates that the species were not necessarily observed on the site. It is staff's opinion that the likelihood for GGS to occur on the proposed site is low. However, impacts to the GGS on the site were considered. The purpose of Table 1 is to list the species evaluated for potential impacts. Staff will change the likelihood for the giant garter snake to occur at the proposed REP to low.

With respect to fish such as the Chinook salmon, Delta smelt, longfin smelt, steelhead, river lamprey, Pacific lamprey, and green sturgeon, the table indicates that the likelihood for these species to occur is low. It is staff's opinion that the likelihood for these species to occur in the project area is low and that the table is an accurate assessment of species evaluated for potential impacts on the REP site and surrounding area.

RE-2 *Pages 4.2-8 through 4.2-19 - Project Specific Impacts. RE has filed an application for a permit under Section 404 of the Clean Water Act, including a revised wetland delineation and revised Biological Assessment that incorporate a slightly changed project configuration and construction plan than is reflected in the PSA. These changes were made in order to avoid sensitive wetlands and grassland ecosystems and minimize the project's potential effects on wetlands and endangered species. Under the new plan, the power plant fenceline has been moved in two places to avoid direct impacts to wetlands. In addition, the construction laydown area has been moved to a location west of the Pleasant Grove Wastewater Treatment Plant. The new laydown area has been permitted for the West Roseville Specific Plan (WRSP) and the potential impacts of the West Roseville buildout have been taken into account and mitigated through the permitting process for the WRSP, the CWA Section 404 permit, and U.S. Fish and Wildlife Service Biological Opinion for the WRSP.*

Under the new construction plan, direct impacts to seasonal wetlands and vernal pool fairy shrimp would be limited to 0.39 acre. There would be indirect impacts to 1.29 acres of vernal pool fairy shrimp habitat. Permanent loss of annual grassland (foraging habitat for Swainson's hawk and white-tailed kite) would total 5.21 acres. We look forward to discussing the revised project proposal with Staff.

Staff response. It is staff's understanding that the wetland delineation has not been verified by the USACE. Will Ness (USACE staff) informed staff that unauthorized construction activities occurred on the REP site. This issue has not been resolved.

Staff reviewed the new site plan. The use of an offsite laydown area avoids some impacts to wetlands and vernal pool grasslands. There are still significant impacts associated with the new site plan.

Staff and RE discussed the potential impacts to vernal pool grasslands associated with the project. Staff has not changed its position considering impacts to vernal pool grasslands as permanent. Use of the areas proposed for office space, parking, and the natural gas pipeline are significant direct, indirect, and cumulative impacts. Because these areas are all proposed for future development, staff fails to understand how restoring these areas would benefit wildlife.

Staff calculated wetland impacts based on the new site plan. RE did not consider impacts associated with the natural gas pipeline in the April 2004 biological assessment. This was discussed with RE by staff and USFWS staff. RE's analysis of natural gas pipeline impacts in the June 2004 biological assessment indicate that its construction would indirectly affect two portions of a large vernal pool. Because construction activities associated with the gas pipeline would affect parts of this pool, the whole pool is considered to be adversely affected and would require mitigation to reduce impacts to less than significant. The portions of the natural gas pipeline that traverse the 70-acre City of Roseville parcel are part of the REP project description. Any impacts associated with the natural gas pipeline in areas where it traverses the 70-acre City of Roseville property, are considered impacts caused by the REP.

Staff reviewed the new biological assessment (June 2004) and recalculated impacts to vernal pool grassland and wetland habitats. It appears that direct impacts to wetted acres would be .40 acres. Staff calculated indirect impacts as 2.2 acres. Staff calculated direct, indirect, and cumulative vernal pool grassland impacts as 12.3 acres.

RE-3 *Page 4.2-8, para 3, vernal pool grasslands fragmentation. "With the exception of the PGWWTP, the surrounding landscape is mostly open space. Construction of the proposed power plant would remove and alter the vernal pool grasslands on the site. Construction and operation of the REP would create new physical boundaries which would divide the vernal pool landscape and create smaller habitat patches. In staff's opinion, this would be habitat fragmentation, and would make the exchange of genetic material between populations more difficult by increasing distance, and creating barriers between populations. In addition, grading and filling vernal pool grasslands would alter the hydrology and topography of the system…."*

RE disagrees that construction and operation of the REP would cause significant harm to the vernal pool system through habitat fragmentation. The construction of the REP would take place largely on the vernal pool grasslands at the site and would remove and alter some of these vernal pool grasslands. Due to the degraded nature of the power plant site, however, only 5.21 acres of the 12-acre power plant site would qualify as annual grassland habitat. The REP would involve the filling of a small number of vernal pools of poor habitat quality, amounting under the existing plan to no more than 0.39 acres of direct impacts. This is a sufficiently low number to qualify for the Corps of Engineers' expedited Nationwide permit program. Hydrologically, the REP site sits at a local high point and would therefore intercept little of the drainage system that feeds the vernal pool complexes to the north and west. The hydrodynamics of this system and the keys to its health as an ecosystem have much more to do with the poor drainage and slow permeability characteristics of the underlying soils than with dependence on a larger upstream watershed.

Staff response. Staff cited only a small number of the large body of scientific studies published on habitat loss, fragmentation and its effects on wildlife and vernal pool grassland ecosystems. The USFWS Biological Opinion for the PGWWTP indicated that construction and operation of the project would result in (among other impacts) vernal pool grassland habitat fragmentation. Dividing the vernal pool grassland would create more edge habitat (fragmentation). More edges give a competitive advantage to edge species allowing invasion of remaining interior habitat. Staff has not seen studies showing that habitat loss does not cause fragmentation but would be interested in reviewing any that have been published.

Staff, and staff from the USFWS, and USACE assessed the site and agreed that the REP and 70-acre City property are hydrologically connected. Altering the vernal pool grasslands of a vernal pool grassland alters the hydrology of the site.

While some of the REP is disturbed, it is part of a larger vernal pool grassland ecosystem, not an annual grassland. The site is not poor quality habitat, but habitat for the threatened vernal pool fairy shrimp and other sensitive species. The proposed REP site and adjacent 70-acre City property are within designated critical habitat for the vernal pool fairy shrimp. A critical habitat designation means that habitat within the designated boundaries possesses the physical and meteorological conditions necessary for the survival and recovery of the vernal pool fairy shrimp.

Vernal pool fairy shrimp presence was confirmed adjacent to the proposed construction zone. Branchinecta cysts were found at 37 percent of locations sampled on the REP site and 70-acre City property. Staff and staff from the USFWS and CDFG concluded that the proposed site is habitat for vernal fairy shrimp and other sensitive species. Vernal pools and associated vernal pool grasslands provide habitat for a wide variety of wildlife, including sensitive species. In evaluating impacts for the proposed REP site, staff excluded disturbed areas.

Staff visited the proposed REP site with Rick Kuyper and Ken Fuller of the USFWS. Staff concluded that a relatively small portion of the site is degraded and of poor quality habitat, and that the majority of the site was vernal pool fairy shrimp habitat. USFWS staff agreed with this assessment.

Reconfiguring the REP site could qualify for a USACE nationwide permit; however, USACE staff have still not verified the REP wetland delineation, and formal consultation with the USFWS has not started. Staff was notified by USACE staff that unauthorized construction activities occurred on the REP site. This issue needs to be resolved before the USACE can analyze REP impacts to jurisdictional wetlands. Therefore, the statement by RE that the REP would qualify for an expedited USACE permit process is not supported by fact.

With respect to site hydrology, RE will route stormwater runoff from the REP to stormwater detention ponds. If the REP sits at a local high point as RE's comment suggests, it seems water that would normally flow to pools/swales downslope from the local high point (REP) would instead be routed to detention basins as part of the REP stormwater management system.

The REP and adjacent City property are hydrologically connected. While poor drainage and slow permeability (resulting from the hardpan or duripan layer beneath vernal pool complexes) certainly is the reason water pools in depressions known as vernal pools and swales, a large body of scientific evidence shows the importance of surface and subsurface water movement to the form and function of vernal pool grasslands. Most resource agency regulatory staff and scientists studying vernal pool grasslands and/or vernal pool crustaceans recognize that movement of water over and through surrounding vernal pool grasslands affects the abundance and distribution of pools/swales, vernal pool crustaceans and the overall health of vernal pool grasslands.

There is a large body of scientific evidence showing the importance of vernal pool grasslands and water movement to the health and function of vernal pool grasslands. Staff would be willing to review and comment on a long-term study proposal from RE hypothesizing that vernal pool grassland habitat is not a vital component of vernal pool grasslands and essential to the survival and recovery of vernal pool fairy shrimp.

RE-4 *Staff states that "…the surrounding landscape is mostly open space." With the addition of the REP, the surrounding landscape will still be mostly open space. Because the REP is planned for a site contiguous with the PGWWTP, and occupies a site that is currently very poor quality habitat, containing little annual grassland of value and less than half an acre of low quality vernal pools, it would not cause a fragmentation of habitat or a significant barrier to populations.*

Staff response. The REP would cause the direct loss of vernal pool grassland habitat. More edge habitat would be created. Habitat loss is fragmentation. The project would also have indirect and cumulative impacts to vernal pool grasslands. Again, the site is within critical habitat for the vernal pool fairy shrimp.

Dwarf downingia, Swainson's hawk, white-tailed kite, western spadefoot and other sensitive species have been observed on the site. This vernal pool grassland is a hydrologically connected, functioning system that provides habitat for sensitive species.

Power plant and laydown areas will be fenced, with roads for access to construction and parking areas. Dry season sampling indicated that Branchinecta cysts were present in two basins sampled within the proposed project footprint and 37 percent of basins within

the 70-acre city parcel. Fairy shrimp presence was documented at the PGWWTP, adjacent to the REP, and some other areas near the proposed REP. It is likely vernal pool fairy shrimp occupy other areas of the site as well. The REP and adjacent City property are considered fairy shrimp habitat. One mechanism for fairy shrimp movement (and the exchange of genetic information) is inundation of habitat. The proposed site is part of a larger hydrologically connected vernal pool grassland. Distribution of fairy shrimp populations is influenced by the amount and movement of water over the vernal pool grasslands.

Construction of the REP would permanently remove a portion of the existing vernal pool grassland within the 70-acre City of Roseville property. Replacement of this portion of the vernal pool grassland with the proposed power plant, associated fences and other infrastructure would contribute direct, indirect, and cumulative impacts from habitat loss and fragmentation, degradation, and take of vernal pool fairy shrimp. Construction of paved surfaces, fences, and roads within the REP and City property would create edge habitat and barriers difficult to overcome by invertebrate populations with small home ranges and limited movement.

Results of dry season sampling indicated that 37 percent of basins sampled contained Branchinecta sp. cysts. Wet season surveys determined that B. lynchi were present adjacent to the proposed REP. USFWS vernal pool fairy shrimp protocols state that once wet season surveys establish presence of vernal pool fairy shrimp, surveys can be terminated and USFWS be consulted. Once it has been determined that vernal pool fairy shrimp are present, the USFWS designates the project site as vernal pool fairy shrimp habitat. The REP site is no exception.

Staff has observed sensitive species on-site and does not consider the site to be low quality habitat. Some areas of the site are disturbed. The acreage amounts of disturbed habitats were not included by staff in acreage impact calculations.

RE-5 *Page 4.2-14, para 1, "Construction of the proposed REP would create smaller habitat patches within the 40-acre site, leaving small islands of marginal habitat available for wildlife."*

Under the revised construction plan, such fragmentation of habitat would not take place. All of the permanent impacts would take place at the power plant site. Temporary construction impacts would be minimized and confined to an area east of the power plant. There would be no isolation of habitat patches, either in the power plant site (permanent) or the construction parking and trailer area (temporary).

Staff response. Although the construction plan has been revised, the new plan would still have a significant impact to sensitive species and sensitive species habitat. Habitat loss results in fragmentation. The previous two construction plans would have resulted in habitat loss, degradation, and fragmentation, and the new plan would also result in habitat loss, degradation, and fragmentation. See staff responses above for comments on habitat fragmentation. Roads are planned for access to construction areas. Habitat would be lost to wildlife for the duration of construction and restoration activities. In addition, areas proposed for restoration are planned for future development. Staff does not see how restoring these areas would benefit wildlife.

RE-6. *Page 4.2-14, para 3, Wetland Impacts*

Under the revised construction plan, direct wetland impacts would be reduced to 0.39 acres, and indirect impacts (250-foot-buffer) would be reduced to 1.29 acres.

Staff response. Use of an off-site laydown areas does reduce impacts to biological resources caused by construction of the REP. Staff rounded up direct impacts to 0.4 acres. Impacts from the natural gas pipeline were not addressed in the first biological assessment and have not been addressed in the new July revision. The gas pipeline is part of the project description, and impacts associated with its construction and operation would be caused by the project. Staff calculated total indirect impacts to wetted vernal pool fairy shrimp habitat as 2.2 acres.

To assess REP indirect impacts to vernal pool fairy shrimp habitat, staff considered a pool/swale adversely impacted if project activities occurred within 250 feet. This is standard USFWS policy when assessing impacts to vernal pool grasslands. If any part of a pool/swale was indirectly or directly affected, the entire pool/swale was considered taken. This method for assessing impacts is the standard method for quantifying impacts to vernal pool fairy shrimp habitat. Staff and USFWS staff informed RE of this on separate occasions.

RE-7 *Page 4.2-14, para. 4, Wetland Impacts*

Please note that RE has adjusted the project fenceline and the construction plan to avoid direct impacts to two systems of connected vernal pools (2/5/6, and 22/42/46/48/50).

Staff response. Staff noted the changes in the construction plan and the change in direct impacts to vernal pools.

RE-8 *Page 4.2-15, para. 2, Indirect Impacts*

Under the US Fish and Wildlife Service's policy, indirect impacts can occur up to 250 feet from the direct impact areas. Indirect impacts are usually temporary and less severe than direct impacts (dust, drainage, etc.) and can often be managed and reduced to negligible levels by the application of erosion and spill control measures, for example. Under the new construction plan and with appropriate mitigation, it will be possible to limit indirect impacts to 250 feet, for both isolated pools and connected pool systems.

Staff response. Staff is not aware of any CEQA definition of indirect impacts indicating that they are usually temporary and less severe than direct impacts. Erosion and spill control measures are required as Best Management Practices (BMP's) for impacts to wetlands, but BMP's are not a substitute for habitat compensation. BMP's will be required in addition to habitat compensation.

CEQA guidelines define indirect impacts as impacts caused by the project although the impacts could occur farther removed in time/distance. The USFWS indicated that vernal pools on the PGWWTP site would be indirectly affected by changes in hydrology,

introduction of pollutants, erosion and human related disturbance. Please note no mention is made that impacts to pools must be down gradient of project activities. The USFWS requires mitigation for indirect impacts to vernal pool fairy shrimp habitat at a ratio of 3:1 preservation. If impacts to vernal pools are less than one-acre, the programmatic ratio of 2:1 preservation may be applicable. In cases where only part of a pool or swale is affected, the standard USFWS practice is to require mitigation for the entire pool or swale. Staff and USFWS staff explained this to RE on separate occasions.

RE did not include indirect impacts associated with construction of the natural gas pipeline. Construction of the gas pipeline would indirectly affect 1.7 acres of wetted vernal pool fairy shrimp habitat. Construction of the power plant, switchyard, office space, and parking areas would indirectly affect an additional 0.8 acres. The total wetted acreage of fairy shrimp habitat indirectly affected would be 2.5 acres.

The USACE enforces a no net-loss policy for impacts to wetlands, including vernal pools. The USACE analyzes impacts to jurisdictional wetlands. Mitigation for the REP will likely require creation of vernal pools at a ratio of 1:1, but until the issue of unauthorized construction activities is resolved, the mitigation requirements of the USACE are unknown.

RE-9 *Page 4.2-16, para. 2, "…construction and operation of the proposed REP would result in habitat loss and fragmentation."*

The REP would result in loss of habitat for the vernal pool fairy shrimp, and RE has proposed a program to replace the lost habitat. The REP, however, would not cause significant habitat fragmentation.

Staff response. Habit loss causes fragmentation. Staff has explained why the REP would cause and contribute to habitat fragmentation in previous responses.

RE-9 *Page 4.2-18, para 4, Sanitary Sewer Pipeline "…within 250 feet of a confirmed vernal pool fairy shrimp population."*

The sanitary sewer pipeline will be constructed within 250 feet of wetland P1, in which cysts of Branchinecta lynchi were found. Indirect impacts on this pool from construction of the sanitary sewer pipeline would be extremely unlikely, however. The pipeline extends along Phillip Road to the City of Roseville's lift station. Wetland P1 is located on the opposite side of the lift station from the pipeline. Furthermore, the lift station, and the sanitary sewer force main alignment that serves it, are elevated features that form a distinct hydrological barrier between the REP sanitary sewer pipeline and wetland P1.

Also, any erosion or siltation effects of construction would be downstream of P1. Therefore, there would be no indirect effect.

Staff response. Wetland P1 (see **Biological Resources Figure 1**) was the area where *B. lynchi* was confirmed. *Branchinecta* sp. cysts were found, but *B. lynchi* was confirmed through identification of the adult stage.

The area in question has already been disturbed from constructing the PGWWTP lift station. Impacts to vernal pool P1 should have been analyzed and mitigated through the permitting of the PGWWTP. Staff and the USFWS staff agreed that the impact to P1 should not be mitigated twice.

RE-10 *Page 4.2-20, para. 3, Cumulative Impacts.*

Please note that it is not the construction of the REP cumulatively with the WRSP that would cause habitat fragmentation. The REP site and construction areas are all contiguous with the PGWWTP and will not cause a significant fragmentation or segmentation of habitats. Currently, and after construction of the REP, habitat as open space will extend for many miles to the west and north of the REP and for at least one mile to the east. While the area immediately to the north of the REP has been incorporated into the City's sphere of influence, the portion that is the riparian corridor of Pleasant Grove Creek is likely to remain as an open space/riparian corridor zone in any future development. Though areas further north and west in Placer County may be subject to future development in County jurisdiction, the County has recently denied development permit applications in some of these areas in order to complete the development of a Habitat Conservation Plan for vernal pool species, a process that will likely take two years or more.

The future construction of the extensions of Blue Oaks Boulevard and Phillip Road as part of the WRSP would take place partly on the REP site and these actions have not yet been permitted by the WRSP owners on the City property. The construction of these roadways would contribute to habitat fragmentation, because they would introduce a barrier between habitat areas on the REP and areas further north and east. This effect would be a direct effect of WRSP development, however, whether or not the REP were licensed and constructed. It is not, therefore, a significant cumulative adverse impact that can be attributed to the REP.

Staff response. Staff analyzed the incremental contribution of the REP to the vernal pool grassland on the 40-acre City parcel. The REP will contribute incrementally to the loss, degradation, and fragmentation of vernal pool grasslands on the 40-acre City property and regionally as well.

The 40-acre parcel and PGWWTP are separated by Phillip Road. Before the construction of the PGWWTP, Phillip Road bisected a portion of a vernal pool grassland ecosystem. Construction of the PGWWTP resulted in habitat loss and continued fragmentation of this vernal pool grassland ecosystem. Constructing the REP would create new fences and borders (more edge habitat), and would contribute to habitat loss and fragmentation within this vernal pool grassland ecosystem. Areas of the 40-acre parcel on which the REP would be located will be developed as part of the WRSP. This scheduled development, would also contribute to habitat loss and fragmentation within the vernal pool grassland ecosystem. The WRSP would develop areas of the 40-acre parcel and areas adjacent to it. Two areas totaling approximately 2500 acres are now under the City of Roseville's sphere of influence. The areas are not scheduled for immediate development, but it seems reasonable to assume that some of this area will be developed. Development of these areas would cause additional habitat loss and fragmentation within the vernal pool grassland ecosystem.

CEQA guidelines state that the lead agency may find a significant cumulative impact based on a project's incremental contribution to an impact regardless of the size of the individual project's contribution.

Staff concludes that the REP would contribute a significant cumulative impact to the vernal pool grassland ecosystem in the project area. In the assessment of cumulative REP impacts, staff considered the lack of a regional, multi species HCP. If such a plan did exist for Placer County, and all Placer County projects mitigated impacts through the HCP, there would be no significant cumulative Placer County impacts. The Placer Legacy HCP is currently in the phase I planning stage. This multi-species plan would allow for individual projects impacting sensitive species and habitats in Placer County to mitigate impacts through a regional mitigation program. Because the Placer Legacy HCP is still in the planning stages, interim projects need to be mitigated on a project by project basis. Mitigating impacts on a project by project basis is not the same as mitigating impacts through an established regional program.

RE-11 *Page 4.2-21, para. 1, "…the proposed REP would also cause adverse cumulative impacts to the following species with the potential to occur in the proposed project area."*

Please note none of these species have been found on the project site. For most of these species, the potential to occur at the REP site is extremely low. Suitable habitat for some species does not exist on the project site (western pond turtle, giant garter snake). The California tiger salamander has not been found in Placer County. In surveys of more than 3,000 acres surrounding the REP site, the WRSP biologists of a variety of local habitats (riparian, oak woodland, grassland, vernal pool grassland) did not observe the Bogg's Lake hedge hyssop, pincushion navarretia, big-scale balsamroot, western pond turtle, California tiger salamander, or giant garter snake. Adverse impacts to most of the species on this list are thus very unlikely, and they should be removed from this list.

Staff response. The table does not indicate that the species were observed on the site. The text does not indicate that the species were observed on the site. The intent is to establish a list of species that could potentially occupy the site because suitable habitat for the species exists on the proposed site and surrounding areas. Wildlife surveys, including sensitive species surveys, are not absolute indicators of the population status of a particular species. Failure to observe a particular species at the time the survey was conducted does not mean they never occupied the area, or will never occupy the area. It only means that the target species were not observed at that particular time point in time. Staff consulted the sensitive species list for the Placer Legacy HCP, California Native Plant Society's Inventory of Rare and Endangered Plants of California, the CNPS list for sensitive plants of Nevada and Placer Counties, and the USFWS species lists provided to RE and Enron for the REP and Roseville Energy Facility respectively.

Loss of sensitive species habitat in Placer County is a concern for agency biologists. The REP would contribute incrementally to the loss of sensitive species habitat in Placer County, and within critical habitat for the vernal pool fairy shrimp.

RE-12 *Page 4.2-24, Table 1, Indirect Impact (creation only)Staff summarizes RE's mitigation plan in Table 1, but misrepresents RE's plan. RE's plan, as outlined in the Biological Assessment, is that both direct and indirect impacts to vernal pool fairy shrimp habitat would be mitigated at a ratio of 2:1 preservation and that the direct impacts would be mitigated with additional acreage at a ratio of 1:1 creation or restoration. There should thus be four cells in the table: direct/preservation, direct/creation, indirect/preservation, indirect/creation, as follows:*

RE's Mitigation Proposal, Biological Assessment (April 2004)

	Direct	***Indirect***	***Total***
Impact	*0.7*	*1.6*	*2.3*
Preservation	*0.7 x 2 = 1.4*	*1.6 x 2 = 3.3*	*4.7*
Creation	*0.7 x 1 = 0.7*	*0*	*0.7*
Total	*2.1*	*3.3*	*5.4*

The Staff Assessment table erroneously states that RE has proposed 3.3 acres of wetland creation for indirect impacts at a ratio of 2:1. The ratio proposed is 2:1, but for preservation, not creation. The table states that RE has "…proposed to preserve 1.4 acres of habitat for direct impacts (0.7 x 2) and create 4.0 acres of habitat for indirect impacts (0.7 x 1 + 1.6 x 2)." The acreage proposed was actually 4.7 acres preserved (both direct and indirect) and 0.7 acres created. This is described on pages 51 and 52 of the Biological Assessment. Under the revised project and construction proposal, RE's mitigation proposal would now be as follows:

RE's Mitigation Proposal, Revised Biological Assessment (July 2004)

	Direct	***Indirect***	***Total***
Impact	*0.39*	*1.29*	*1.68*
Preservation	*0.39 x 2 = 0.78*	*1.29 x 2 = 2.58*	*3.36*
Creation	*0.39 x 1 = 0.39*	*0*	*0.39*
Total	*1.17*	*2.58*	*3.75*

The table is titled "RE's Proposed Wetland Mitigation." It is important to distinguish mitigation proposed for vernal pool fairy shrimp habitat from mitigation proposed for wetlands, per se, because in some cases, wetlands are not fairy shrimp habitat, and vice-versa, and may be accounted for separately with a compensation ratio of 1:1 (direct impacts only). In this case, the wetlands are also vernal pool fairy shrimp habitat.

In paragraph 2 on page 4.2-24, Staff appears to agree with RE's mitigation ratios for direct impacts ("Staff agrees with the 2:1 preservation and 1:1 creation ratios proposed for direct impacts to vernal pool fairy shrimp habitat…").

RE-13 *Page 4.2-24, para 3, "…Staff does not agree with RE's mitigation proposal based on programmatic consultation. The proposed REP impacts to vernal pools/swales would be greater than 1 acre…"*

RE acknowledges that REP impacts to vernal pools and swales would be greater than 1 acre and does not propose that the US Army Corps of Engineer's consultation with the USFWS regarding the projects impacts to listed species be conducted on an expedited basis under the February 28, 1996, programmatic agreement between these two agencies. RE proposes, however, that the mitigation ratios stipulated in the programmatic agreement (2:1 preservation for both direct and indirect impacts, plus 1:1 creation for direct impacts) set a reasonable standard for a project of this nature. This is the mitigation ratio that the USFWS applied for the WRSP and has applied for a number of projects in the City of Roseville.

RE-14 *Page 4.2-24, para 3, "…the ratio for indirect impacts would be 3:1 preservation only….No preservation is required, but creation at 3:1… is necessary."*

This paragraph is contradictory, because Staff initially proposes a mitigation ratio of 3:1 preservation for indirect impacts. Later in the paragraph, Staff states that the USFWS mitigation ratio would be 1:1 creation for plus an additional 2:1 preservation for direct impacts and that for indirect impacts, the ratio would be 3:1 creation. Again, RE proposes following the USFWS standard as set in the programmatic agreement for projects having relatively small impact, of 2:1 preservation for indirect and direct impacts, plus an additional 1:1 creation, only for direct impact acreage.

RE-15 *Page 4.2-25, Table 2*

The table title refers to wetland mitigation instead of vernal pool fairy shrimp habitat mitigation (see comment, above). This table also proposes 3:1 creation for indirect impacts. This is unreasonable and inconsistent with the USFWS standard.

Staff response to RE-12-15. Staff erred in proposing mitigation ratios for indirect impacts. The statement should have been 3:1 preservation for indirect impacts. The 3:1 ratio was based on the REP site plan submitted in April 2004. Based on the April 2004 plan, direct and indirect wetland impacts combined totaled 4.7 acres.

Staff re-evaluated impacts associated with construction and operation of the project based on the new REP construction plan. The combined total of direct and indirect impacts to wetlands per the new plan would be 2.9 acres.

Because the new site plan avoids some direct impacts to wetted and vernal pool grassland areas on the proposed site, USFWS staff indicated that a 2:1 ratio (preservation only) for indirect impacts to vernal pool fairy shrimp habitat would be appropriate. The ratio for direct impacts would be 2:1 preservation and 1:1 creation.

There were some typos in the PSA delineating the differences between direct and indirect impact ratios. Staff mistakenly stated that indirect impacts to fairy shrimp habitat would require creation only. The correct statement is that indirect impacts would require preservation only.

After the PSA workshop, RE redesigned the REP site. The new plan proposes an off-site laydown area that would avoid some impact to wetlands and vernal pool

grasslands. Based on the new proposal, the USFWS indicated that the programmatic mitigation ratio would be applied to the REP.

Because RE reconfigured the site to avoid some of the impacts, the programmatic ratio is appropriate for the project. Prior to redesigning the construction area, impacts to wetted areas of the vernal pool grassland were well outside consideration for programmatic ratios. Prior to reconfiguring the site, direct and indirect impacts were 4.7 acres combined.

Indirect impacts to vernal pools caused from constructing the natural gas pipeline were not calculated per USFWS protocol; therefore, RE's proposal to mitigate impacts to wetted fairy shrimp habitat would not mitigate impacts to levels less than significant. Regarding definitions of wetlands versus fairy shrimp habitat, staff discussed the aforementioned definitions in the PSA. Staff also discussed the jurisdictional differences between the USFWS and the USACE. Staff also indicated that the REP site and adjacent City property were fairy shrimp habitat. Staff indicated that wetlands under jurisdiction of the USACE have had not been analyzed for impacts. What is important to note is that mitigation required by the USACE will likely be separate from that required by the USFWS.

RE-16 *Page 4.2-25, Staff Proposed Mitigation, "Because of the number of species that could potentially be directly and indirectly affected by the loss, degradation, and fragmentation of vernal pool grasslands on the proposed REP, Staff proposes…"*

Staff states that the mitigation ratio for annual grassland be increased from the CDFG guideline ratio of 0.75:1 to 1:1 "because of the number of species involved and due to loss, degradation, and fragmentation," and lists 18 species as "potentially affected." The following sensitive vernal pool grassland species on this list, however, have not been reported as present at or near the REP site and were not reported in the WRSP area by WRSP biologists, as described above: Bogg's Lake hedge hyssop, pincushion navarretia, big-scale balsamroot, or giant garter snake. In reality, sensitive species that have been documented as being present on site include vernal pool fairy shrimp and dwarf downingia, plus Swainson's hawk and white-tailed kite as foraging raptors. Other species that have been found nearby include western spadefoot toad and burrowing owl. Presence of many of the other species mentioned in the PSA is hypothetical. Please note also, that the REP will not cause significant fragmentation of habitat.

Staff response. RE proposed the 1:1 ratio for impacts to Swainson's hawk foraging habitat (See Biological Assessment submitted by RE, Section 5.3.2, pg 53). Staff indicated why this ratio was appropriate. The mitigation is not only for Swainson's hawk foraging habitat. Staff does not agree with the acreage amount proposed as compensation for impacts to Swainson's hawk foraging habitat, vernal pool vernal pool grasslands as well as indirect impacts to other sensitive species that could potentially use the habitat.

Staff indicated which species were observed and which species had the potential to occur.

Habitat loss causes fragmentation. See staff responses above regarding habitat fragmentation.

RE-17 *Page 4.2-27-28, Proposed Conditions of Certification **BIO-1** and **BIO-2**– These conditions should be modified as shown below so that they are consistent with other previously licensed projects that allow Biological Monitors or appropriately trained individuals to perform monitoring activities at the site. In addition, RE requests the verification timeline be modified to expedite the review of the required resumes. Staff should not require 60 days to complete such a review.*

> ***BIO-1*** *The project owner shall submit the resume, including contact information, of the proposed Designated Biologist and **Biological Monitors** to the CPM for approval.*
>
> ***Verification****: The project owner shall submit the specified information at least ~~60~~ **30** days prior to the start of any site (or related facilities) mobilization. Site and related facility activities shall not commence until an approved Designated Biologist **and Biological Monitors are** ~~is~~ available to be on site.*

Staff response. Staff agrees to add Biological Monitors to the condition and verification. However, staff does not see a need to expedite approval of resumes. If the resumes of proposed Designated Biologists or Biological Monitors are rejected, the 60 day timeframe would give the project owner additional time to locate suitable replacements.

> ***BIO-2*** *The project owner shall ensure that the Designated Biologist **and Biological Monitors** 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 and Operation Managers 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. *Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (parking lots) for animals in harms way;*
> 5. *Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and*

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

All inspections may be performed by either the Designated Biologist or the Designated Biologist's appropriately trained delegate.

Staff response. Staff will add number seven to the condition to read: The Designated Biologist will accept responsibility for inspections conducted by Biological Monitors.

*Page 4.2-29-30, Proposed Condition of Certification **BIO-4** – RE requests the condition be revised as follows to indicate that the worker training can be conducted by video tape, which has been successful in other projects.*

BIO-4 *The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) training in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure are informed about sensitive biological resources associated with the project.* ***The training may be presented in the form of a video.***

Staff response. Staff agrees to the use of training using videos.

RE-18 *Page 4.2-32-33, Proposed Condition of Certification **BIO-7** - CDFG has indicated, that for the nature and size of the REP, and based on the impacts evaluation, an Incidental Take Permit would not be necessary (J. Finn pers. comm. with Eric Htain). Therefore, **BIO-7** should be deleted.*

Staff response. Jeff Finn (CDFG staff) forwarded staff an email he sent to Eric Htain (RE consultant) regarding REP impacts to Swainson's hawk and white-tailed kite. Jeff did not indicate that the nature and size of the REP would exclude it from an incidental take permit. CDFG staff indicated that an incidental take permit is not needed for impacts to Swainson's hawk foraging habitat for any project. However the project is between one and five miles from active nests. This does require mitigation for impacts to foraging habitat. An incidental take permit is required for impacts to nesting Swainson's hawks. The white-tailed kite is fully protected and no permit can be issued for incidental take. This does not mean the REP would not impact white-tailed kites or that they are not protected. It means that no take, including in the course of permitted activities is allowed. Penalties for take of white-tailed kites are enforced by CDFG wardens. Jeff agreed with staff's assessment of habitat and vernal pool grassland mitigation needed for the REP.

RE-19 *Page 4.2-34, Proposed Conditions of Certification **BIO-13** and **BIO-14** – RE disagrees with the amounts of vernal pool mitigation and vernal pool grassland habitat mitigation reflected in **BIO-13** and **BIO-14**. As discussed above, the amount of mitigation must be revised based on RE's modification of the location of a portion of the construction laydown area. Additionally, RE requests the following modification to the Verification for **BIO-13** be made to clarify that a plan for endowment, rather than the*

endowment must be submitted prior to site mobilization activities. Additionally, RE requests a shorter verification timeline.

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> ***Verification****: At least 60 days prior to any site, or related facilities mobilization activities, the project owner shall provide to the CPM, for review and approval by staff, CDFG, USACE and USFWS, the location for the preservation and creation of vernal pools. In addition, the project owner shall provide the name of the entity which would protect the habitat in perpetuity, a plan for an endowment to manage the habitat in perpetuity, a wetland construction plan/schedule, and an adaptive management plan to be reviewed and approved by staff in consultation with CDFG and USFWS.*

Staff response. RE failed to account for indirect impacts to wetted vernal pool fairy shrimp habitat that would be caused from constructing the natural gas pipeline. Staff reviewed the revised construction plan that proposed use of the offsite laydown area. Staff concluded that vernal pool grassland impacts were reduced but still permanent and significant.

RE-20 ***Page 4.2-15, para. 2, Indirect Impacts***

Staff indicates that the REP would have an indirect effect on 4.6 acres of vernal pool systems. Applicant has changed the project construction plan to minimize impacts to vernal pools by moving the construction laydown area making minor adjustments to the site boundary. See the revised drawing in Attachment 3. Under the Applicant's revised construction plan, the REP's indirect impact acreage would be 2.53 acres. This includes indirect impacts of the permanent project facilities as well as the temporary construction parking and construction office areas, and includes effects on downstream pools connected with vernal pools located within the 250-foot indirect impact buffer area. We therefore propose the following revision to Condition of Certification BIO-13.

> ***BIO-13*** *As conpensation for direct and indirect impacts to vernal pools and vernal pool fairy shrimp, the project ownere shall provide mitigation in a form acceptable to USFWS, as specified in the Biological Opinion, according to the mitigation table.*

	Direct	*Indirect*	*Total*
Impact	*0.39*	*2.53*	*2.92*
Preservation *Creation*	*0.39 x 2 x 2 = 0.78* *0.39 x 1 = 0.39*	*2.53 x 2 = 5.06* *0*	*5.84* *0.39*
Total	*1.17*	*5.06*	*6.23*

Verification: *At least 90 days prior to any site or related facilities mobilization activities, the project owner shall provide to the CPM, for review and approval by staff, USACE and USFWS, either 1) the location for the habitat compensation to be used to preserve and/or vernal pools; the name of the entity which would protect the habitat in perpetuity; a plan for an endowment to manage the habitat in perpetuity; and an adaptive management plan to be reviewed and approved by staff in consultation with*

USFWS; or 2) documentation that the project owner has paid the appropriate amount into the in lieu fee program approved by USFWS.

Staff response. Staff reviewed RE's revised impact analysis. Technically, the off-site laydown area is part of the REP project and would impact vernal pool grassland. Even though the location for the new laydown area is planned for development, it is still part of the REP project. The USFWS has issued a BO for the impact area, but the USACE has issued only a draft 404. Staff could require mitigation for disturbances associated with the off-site laydown area. However, staff took into consideration RE's effort to avoid some impacts to the 40-acre City property. The new analysis takes into account the indirect impacts associated with constructing the natural gas pipeline. The wetted acre impact analysis appears to be correct.

Staff does not agree that simply paying a fee into the USFWS species account would fully mitigate REP impacts to wetted vernal pool fairy shrimp habitat. Staff discussed this in the PSA. Staff has proposed **BIO-13** and **BIO-14** to mitigate potential impacts to vernal pool grasslands and sensitive species to levels less than significant.

RE-20. *Additionally, RE and staff discussed the effect of RE's relocation of the construction laydown area on Staff's determination that vernal pool grassland impacts associated with temporary construction activities were permanent and significant. With the relocation of the construction laydown area and RE's commitment to restore the remaining construction office and parking area, including restoration of the existing soil pile on site, RE believes that staff can make a finding the the temporary impacts associated with construction activities in these areas are insignificant. Therefore, RE has modified Condition of Certification BIO-14 as follows:*

> *BIO-14 The project owner shall provide at least 3.9 acres of habitat compensation for direct impacts to vernal pool grassland habitat suitable for Swainson's hawk, White-tailed kite, Northern harrier, Burrowing owl, Golden eagle, Horned lark, Ferruginous hawk, Lawrence's goldfinch, Cooper's hawk, and Bald eagle. The owner shall restore areas used during construction and for worker parking and construction offices totaling 5.54 acres to annual grassland foraging habitat by removing gravel, reseeding with native species, and other appropriate measures.*

Staff response: Staff does not consider the disturbance of the vernal pool grassland component of the vernal pool grassland associated with constructing the worker parking, office spaces, and gas pipeline temporary impacts. Restoring these areas would not benefit wildlife as these areas are scheduled for future development. Staff has discussed this issue in depth in responses to other RE comments, in the PSA and the FSA. Total impact to vernal pool grasslands would be 13.6 acres.

CONCLUSIONS AND RECOMMENDATIONS

The USACE has received but not verified the REP wetland delineation. RE has submitted a 404 permit application for a Nationwide permit. The USACE can not begin consultation with the USFWS, and the timeline for the USFWS issuing a Biological

Opinion (135 days from request for consultation) could affect the schedule for project licensing.

If the following conditions of certification are adopted by the Commission, the impacts to vernal pool grasslands and sensitive species will be mitigated to levels less than significant.

CONDITIONS OF CERTIFICATION

Staff proposes the following Conditions of Certification to mitigate potential project impacts to levels less than significant.

Designated Biologist Selection

BIO-1 The project owner shall submit the resume, including contact information, of the proposed Designated Biologist and Biological Monitors to the CPM for approval.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any site (or related facilities) mobilization. Site and related facility activities shall not commence until an approved Designated Biologist and Biological Monitors are available to be on site.

The Designated Biologist must meet the following minimum qualifications:

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

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

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

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist.

Designated Biologist Duties

BIO-2 The project owner shall ensure that 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 and Operation Managers 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. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (parking lots) for animals in harms way;

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

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

7. The Designated Biologist will accept responsibility for inspections performed by Biological Monitors.

Verification: The project owner shall ensure that the Designated Biologist maintains written records of the tasks described above, and summaries of these records shall be submitted in the Monthly Compliance Reports.

During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report.

Designated Biologist Authority

BIO-3 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist to ensure conformance with the biological resources Conditions of Certification.
Protocol: If required by the Designated Biologist, the project owner's Construction/ Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be 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 of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the halt.

Verification: The project owner shall ensure that the Designated Biologist 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 of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

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

Worker Environmental Awareness Program

BIO-4 The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure are informed about sensitive biological resources associated with the project. The training may be presented in the form of a video.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two (2) copies of the WEAP and all supporting written materials prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

The signed training acknowledgement forms shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

During project operation, signed statements for active project operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-5 The project owner shall submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The final BRMIMP shall identify; (typical measures are)

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

2. All biological resources Conditions of Certification identified in the Commission's Final Decision;

3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CDFG Incidental Take Permit and Streambed Alteration Agreement and Regional Water Quality Control Board permits;

5. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;

6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;

7. All required mitigation measures for each sensitive biological resource;

8. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

9. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

10. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;

11. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;

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

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

14. All performance standards and remedial measures to be implemented if performance standards are not met;

15. A discussion of biological resources related facility closure measures;

16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and

17. A copy of all biological resources permits obtained.

Verification: The project owner shall provide the specified document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM, in consultation with the CDFG, the USFWS and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS and appropriate agencies to ensure no conflicts exist.

Within thirty (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 site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Closure Plan Measures

BIO-6 The project owner shall incorporate into the permanent or unexpected permanent closure plan, and the BRMIMP, measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan shall address the following biological resources related mitigation measures (typical measures are):

1. Removal of transmission conductors when they are no longer used and useful;

2. Removal of all power plant site facilities and related facilities;

3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and

4. Revegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

Verification: At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, which is incorporated into the BRMIMP, in a Biological Resources Element. The Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Concurrence Statement

BIO-7 The project owner shall acquire an incidental take permit or concurrence statement from the California Department of Fish and Game (CDFG) (per Section 2081(b) of the Fish and Game Code; California Endangered Species Act) and incorporate the terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the incidental take permit/concurrence statement or a letter stating it is not needed.

Streambed Alteration Agreement

BIO-8 The project owner shall acquire a Streambed Alteration Agreement from the CDFG (per Section 1600 of the Fish and Game Code), and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Streambed Alteration Agreement.

Regional Water Quality Control Board Certification

BIO-9 The project owner shall acquire the Regional Water Quality Control Board Section 401 state Clean Water Act certification, and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall provide the CPM with a copy of the final Regional Water Quality Control Board's certification.

Federal Biological Opinion

BIO-10 The project owner shall provide final copies of the Biological Opinion per Section 7 of the federal Endangered Species Act obtained from the U. S. Fish and Wildlife Service. The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U. S. Fish and Wildlife Service's Biological Opinion.

U. S. Army Corps of Engineers Section 404 Permit

BIO-11 The project owner shall provide a final copy of the U.S. Army Corps of Engineers Section 404 of the federal Clean Water Act permit. The biological resources related terms and conditions contained in the permit shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U.S. Army Corps of Engineers permit.

Construction Mitigation Management to Avoid Harassment or Harm

BIO-12 The project owner shall manage their construction site, and related facilities, in a manner to avoid or minimize impacts to the local biological resources.

Typical measures are:

1. Temporarily fence and provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence. The temporary fence shall be hardware cloth or similar materials that are approved by USFWS and CDFG;

2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week. Feeding of wildlife shall be prohibited;

3. Prohibit non-security related firearms or weapons from being brought to the site;

4. Prohibit pets from being brought to the site; and

5. Report all inadvertent deaths of sensitive species to the appropriate project representative. Injured animals shall be reported to CDFG and the project owner shall follow instructions that are provided by CDFG.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and supplied to the CPM no less than 30 days prior to site mobilization.

NOTE: Only one of the following conditions will apply when the preferred natural gas pipeline is selected, BIO-13 for Alternative A or BIO-14 for Alternative D.

Habitat Compensation (Vernal Pool Ecosystem), Alternative A

BIO-13 To compensate for direct, indirect, and cumulative impacts to a vernal pool ecosystem (vernal pool grasslands, vernal pools, vernal pool fairy shrimp and its habitat, and seasonal wetlands) the project owner shall preserve at least 20.6 acres of vernal pool grassland habitat occupied by vernal pool fairy shrimp. The habitat shall be approved by the CPM, must be suitable for other sensitive species, contain at least 6.5 wetted acres, and be contiguous with a larger vernal pool grassland ecosystem.

Verification: At least 60 days prior to any site, or related facilities mobilization activities, the project owner shall enter into an agreement with the Center for Natural Lands Management (CNLM) or other suitable land management organization to locate, acquire and manage 20.6 acres of vernal pool grassland habitat (including a minimum of 6.5 wetted acres). The project owner shall pay all costs incurred by the CNLM (or other suitable land management organization) resulting from locating, acquiring, and managing the compensation habitat. The project owner shall provide a copy of the agreement to the CPM. After habitat has been acquired, the project owner shall provide proof that the habitat has been purchased and preserved in perpetuity, that a suitable endowment (derived through a PAR or other suitable analysis) has been provided to manage the habitat in perpetuity, and the name of the non-profit organization designated as manager of the habitat. No more than 90 days from the date of habitat acquisition, the project owner shall also provide a habitat management plan to the CPM, CDFG, and USFWS for review and approval. All documents are to be included in the BRMIMP.

Habitat Compensation (Vernal Pool Ecosystem), Alternative D

BIO-14 To compensate for direct, indirect, and cumulative impacts to a vernal pool ecosystem (vernal pool grasslands, vernal pools, vernal pool fairy shrimp and its habitat, and seasonal wetlands) the project owner shall preserve at least 17.8 acres of vernal pool grassland occupied by vernal pool fairy shrimp. The habitat shall be approved by the CPM, be suitable for other sensitive species, contain at least 6.3 wetted acres, and be contiguous with a larger vernal pool grassland ecosystem.

Verification: At least 60 days prior to any site, or related facilities mobilization activities, the project owner shall enter into an agreement with the Center for Natural Lands Management (or other suitable land management organization) to locate, acquire and manage 17.8 acres of vernal pool grasslands (including a minimum of 6.3 wetted acres). The project owner shall pay all costs incurred by the CNLM (or other suitable land management organization) resulting from locating, acquiring, and managing the habitat compensation. The project owner shall submit a copy of the agreement to the CPM. After habitat has been acquired, the project owner shall provide proof that the habitat has been purchased and preserved in perpetuity, that a suitable endowment (derived through a PAR or other suitable analysis) has been provided to manage the habitat in perpetuity, and the name of the non-profit organization designated as manager of the habitat. No

more than 90 days from the date of habitat acquisition, the project owner shall also provide a habitat management plan to the CPM, CDFG, and USFWS for review and approval. All documents are to be included in the BRMIMP.

U. S. Fish and Wildlife Service In-Lieu Fund

BIO-15 If the CNLM (or other suitable land management organization) has not located habitat deemed suitable by the CPM six months after initial site mobilization activities, the project owner shall submit the USFWS fee of $135,000 per acre or a fee level directed by the USFWS, to be applied to REP habitat impacts and deposited into the USFWS in-lieu fund. The project owner shall provide a check to the USFWS in the amount of $2,781,000 ($135,000 X 20.6 acres) for alternative A, or $2,403,000 ($135,000 X 17.8 acres) for alternative D.

Verification: If suitable habitat is not acquired within six months from the date of the initial site mobilization activities, the project owner shall provide to the CPM, copies of the check made out to the USFWS in the amount of $2,781,000 for alternative A, or $2,403,000 for alternative D.

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BIOLOGICAL RESOURCES - FIGURE 1

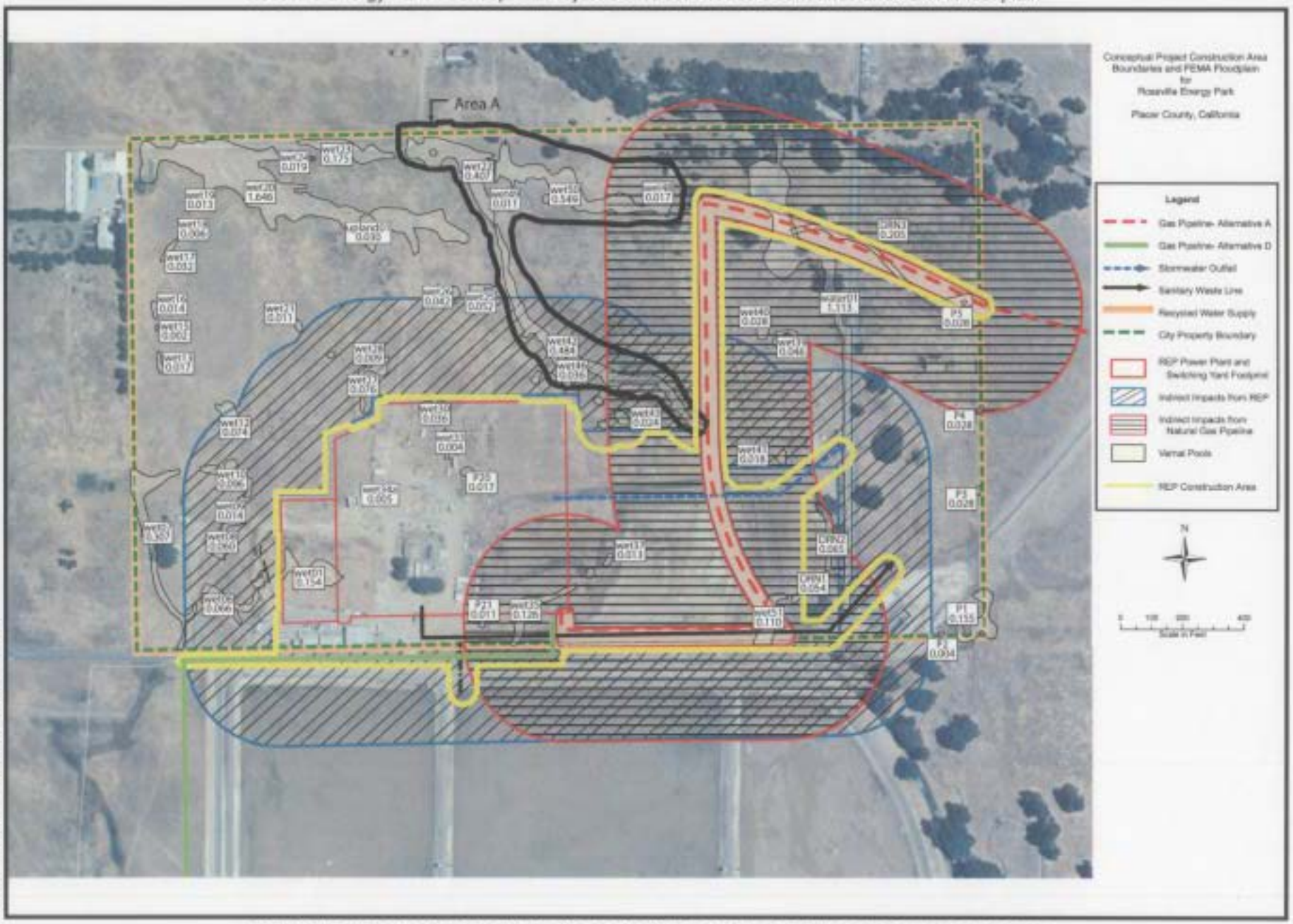
Roseville Energy Park - Conceptual Project Construction Area Boundaries and FEMA Floodplain

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Figure provided by informal request during April 15, 2004 workshop & Roseville Electric 2004C

BIOLOGICAL RESOURCES - FIGURE 2

Roseville Energy Park - Conceptual Project Construction Area Boundaries and FEMA Floodplain



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Figure provided by informal request during April 15, 2004 workshop & Roseveille Electric 2004C

BIOLOGICAL RESOURCES - FIGURE 3

Roseville Energy Park - Conceptual Project Construction Area Boundaries and FEMA Floodplain

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Figure provided by informal request during April 15, 2004 workshop & Roseville Electric 2004C

CULTURAL RESOURCES

Testimony of Gary Reinoehl

INTRODUCTION

This cultural resources analysis identifies potential impacts of the proposed Roseville Energy Park (03-AFC-1) (REP) to cultural resources, as defined under state and federal law. The primary concern in the cultural resources analysis for this project is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below a level of significance under the California Environmental Quality Act (CEQA) and under the National Environmental Policy Act (NEPA).

Staff provides a cultural overview of the project, as well as analyses of potential impacts from the project using criteria from the CEQA and the National Historic Preservation Act (NHPA). If cultural resources are identified, staff determines whether there may be a project related impact to identified resources and if the resource is eligible for the California Register of Historic Resources (CRHR) or the National Register of Historic Places (NRHP). If the resources are eligible for either register, staff recommends mitigation that attempt to ensure that no significant impacts will occur and that impacts to the cultural resources are reduced to a less than significant level, if possible.

There is always a potential that a project may impact a previously unidentified prehistoric or historic resource in an unanticipated manner. Staff, therefore, recommends procedures in the conditions of certification that mitigate these potential impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following laws, ordinances, regulations, and standards (LORS) and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these LORS.

FEDERAL

- Code of Federal Regulations, 36 CFR Part 61 (48 FR 44716), revised July 1, 2003. Federal Guidelines for Historic Preservation Projects: The U.S. Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The State Historic Preservation Office refers to these standards in its requirements for mitigation of impacts to cultural resources on public lands in California.
- Code of Federal Regulations, 36 CFR Part 800 et seq., the implementing regulations of Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470 requires federal agencies to take into account the effects of their undertakings on historic

properties through consultations beginning at the early stages of project planning. The regulations implementing this act, which were revised in 1997, set forth procedures to be followed for determining eligibility of cultural resources, determining the effect of the undertaking on the historic properties, and how the effect will be taken into account. The eligibility criteria and the process described in these regulations are used by federal agencies. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historical Resources.

STATE

- California Code of Regulations, Title 14, section 4852 defines the term "cultural resource" to include buildings, sites, structures, objects, and historic districts.
- Public Resources Code, Section 5000 establishes the California Register of Historical Resources (CRHR), establishes criteria for eligibility to the CRHR, and defines eligible resources. It identifies any unauthorized removal or destruction of historic resources on sites located on public land as a misdemeanor. It also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and establishes the penalty for possession of such artifacts with intent to sell or vandalize them as a felony. This section defines procedures for the notification of discovery of Native American artifacts or remains, and states that it is the policy of the State that Native American remains and associated grave artifacts shall be repatriated.
- The California Environmental Quality Act (CEQA) (Public Resources Code, section 21000 et seq.; Title 14, California Code of Regulations, section 15000 et seq.) requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.
- Public Resources Code section 21083.2 states that the lead agency determines whether a project may have a significant effect on “unique” archaeological resources; if so, an Environmental Impact Report (EIR) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses excavation as mitigation; limits the applicant’s cost of mitigation; sets time frames for excavation; defines “unique and non-unique archaeological resources;” and provides for mitigation of unexpected resources. [The California Energy Commission process is a CEQA equivalent process.]
- Public Resources Code section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource. The section further defines a “historic resource” and describes what constitutes a “significant” historic resource.
- CEQA Guidelines, Title 14, California Code of Regulations, section 15126.4(b), prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project’s impact on a historical resource; discusses documentation as a mitigation measure; and discusses mitigation through avoidance of damaging effects on any historical resource of an

archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

- CEQA Guidelines, section 15064.5 defines the term "historical resources," explains when a project may have a significant effect on historic resources, describes CEQA's applicability to archaeological sites, and specifies the relationship between "historical resources" and "unique archaeological resources." Subsection (f) directs the lead agency to make provisions for historical or unique archeological resources that are accidentally discovered during construction.
- Penal Code, section 622 1/2 states that anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.
- California Health and Safety Code, section 7050.5 states that if human remains are discovered during construction, the project owner is required to contact the county coroner.
- California Health and Safety Code, section 18961 states that all agencies which enforce and administer approvals, variances, or appeals procedures or decisions affecting the preservation or safety of the historical aspects of historical buildings shall use the alternative provisions of this part and shall consult with the State Historical Building Safety Board to obtain its review prior to undertaking action or making decisions on variances or appeals which affect historical buildings.

LOCAL

Placer County

The County of Placer protects cultural resources by reviewing development applications for compliance with CEQA. More specifically, the Placer County General Plan (1994, Section 5) specifically addresses the identification and protection of cultural resources in a series of policy statements. County Comprehensive General Plan Land Use Standards require the Planning Department to determine whether proposed development will alter or destroy an historical site or an archaeological site, cause a substantial adverse change in the significance of an historical or archaeological resource (cf. California Code of Regulations 15064.5), disturb any human remains, or restrict existing religious or sacred uses.

Placer County's General Plan identifies one primary objective that is specifically designed for the protection of both Historic and Prehistoric cultural resources. The objective or goal, as it is referred in Section 5.D of the general plan, calls for the identification, protection, and enhancement of the county's important historical, paleontological, and cultural sites and their environment. It is under this stated goal that the county further defines sixteen separate policy statements that relate to numerous aspects of cultural resource management. The stated policies are the joint responsibility of the Parks Department, Planning Department, and Department of Museums. In addition, Placer County's Park Classification System, policy (5.A.19.), states that areas, sites, and buildings considered culturally significant are protected, managed and maintained. When appropriate, and as a secondary objective, the county encourages the use of these specially designated areas for recreational events.

City of Roseville

The General Plan of the City of Roseville (2003) establishes the following goals with respect to land use, open space, and conservation issues as these relate to the enhancement, protection and interpretation of cultural resources. The City recognizes that archeological, historical and cultural resources identify Roseville's heritage and provides direction for preservation and management of these sites and buildings. The City maintains a commitment to the preservation of known cultural resources and recognizes the importance of cooperation with outside agencies that include, but are not limited to, the State Office of Historic Preservation and the California Native American Heritage Commission (Open Space and Conservation Element , p. V33-34).

1. A commitment to preserving its small town attributes and cultural heritage, while preserving individual neighborhoods and promoting a prosperous business community (Land Use Element, Community Form, Goal 1b, p. II-30).

2. Emphasize the preservation and enhancement of historically and culturally significant buildings, woodlands and other significant features, as a primary element of Roseville's character (Land Use Element, Community Design, Goal 4. p. II-40).

3. Strengthen and maintain Roseville's unique identity through the protection of its archaeological, historic and cultural resources (Open Space and Conservation Element, Goal 1, p. V-37).

The Open Space and Conservation Element of the Roseville General Plan include the following policies for Archaeological Historic and Cultural Resources (pp. V-37 and V-38):

1. When items of historical, cultural or archaeological significance are discovered within the City, a qualified archaeologist or historian shall be called to evaluate the find and to recommend proper action.

2. When feasible incorporate significant archaeological sites into open space areas.

3. Subject to approval by the appropriate federal, state, and local agencies, artifacts that are discovered and subsequently determined to be "removable" should be offered for dedication to the Maidu Park Native American Interpretive Center.

4. Preserve and enhance Roseville's historic qualities through the implementation of the Downtown, Old Town and Riverside Master Plans.

5. Establish standards for the designation, improvement and protection of buildings, landmarks, and sites of cultural and historic character.

6. Participate in the completion of a countywide inventory of historical sites.

7. Encourage public activities, including the placement of monuments or plaques, that recognize and celebrate historic sites, structures, and events.

8. Explore funding for cultural, archaeological and historic programs and activities.

9. Provide opportunities to public awareness and education through coordination with the Historical Society and local schools.

West Roseville Specific Plan

In addition to the General Plan established for the City of Roseville, there is a specific plan for West Roseville. This document was also prepared for the City of Roseville, and is entitled the West Roseville Specific Plan and Sphere of Influence Amendment, 2003 (WRSP). The WRSP refers to the goals and policies in the Roseville General Plan. The WRSP also recognizes the Fiddyment Ranch Complex as a resource to be preserved as a community facility for use by the City. No specific measures that detail the reuse of the complex are provided.

ENVIRONMENTAL SETTING

The Roseville Energy Park (REP) project as proposed would be located on a 12-acre site within a 40-acre parcel owned by the City of Roseville, within the city limits and in Placer County. The proposed plant is adjacent to and north of the Pleasant Grove Waste Water Treatment Plant. The project site consists of relatively flat terrain between Phillip Road and Pleasant Grove Creek. The project area is within a 3,162 acre West Roseville Specific Plan (WRSP) development area although it is not part of the WRSP (Roseville 2003a, pp.1-1, 1-7, Figure 8.3-1).

Refer to the **PROJECT** DESCRIPTION section of this Final Staff Assessment for additional information and maps of the project development region and the project area.

PREHISTORIC SETTING

Sites around the state of California are thought to have been occupied before 11,000 years before present (“BP”, the BP base date is defined as 1950). Assemblages are small and do not always represent completed tools. Amino-acid dating has been used on some bone from sites that resulted in very early dates. The Amino-acid dating is relatively new and is not fully calibrated so absolute dates are still questionable. Some carbon based materials collected from early sites are believed to have predated the deposits making the radiocarbon dates from the carbon based materials older than the actual deposit. Some of the early sites have been dated from the geological formation that the deposits were found within. In most cases, the early dates from these sites are not fully accepted in the archeological community (Moratto 2004, pp 37-73).

Current archeological knowledge assumes the early inhabitants of California were small groups of hunters and gatherers, relying heavily on the Pleistocene mega fauna. Archeological remains believed to be from this early period were found near Farmington, close to the project area. Possibly archeological materials found near Rancho Murietta may be related to the Farmington materials (Moratto 2004, pp. 62-64).

There are many more well dated deposits between 10,000 and 6,000 years BP. The larger share of these sites is found in southern California and the Great Basin. Sites from this period in the inland areas tend to concentrate around lake shores and marshes, while coastal sites tend to concentrate along old stream channels and estuaries. Animals that live on land as well as in the water were hunted for food. The abundant food resources in the lacustrine (lake edge), marshland, and estuarine (tidal area of a river) areas were sufficient to support larger populations than during the earlier period. Lithic (stone) technology became more sophisticated and the assemblages exhibited a wider array of specialized tools. Archeologist assume that these peoples were still nomadic in nature, probably moving in seasonal rounds (Moratto 2004, pp.76-113).

During the last 6,000 years, the populations in California developed more local variation. Large villages became more common. Archeologists have divided this time period into Early, Middle and Late Horizons. Different archeologists studying the Sacramento Valley area have broken the horizons at somewhat different times or have referred to the divisions as Cultures, Patterns or Aspects. Better preservation of archeological materials from the more recent times has allowed greater understanding of the people and better interpretation of the cultural adaptations (Moratto 2004, pp. 168-216).

This period is characterized by greater reliance on acorns as a staple. Large villages near creeks and rivers are common. Trade is more developed where imported shell beads and obsidian are more frequently found in deposits. Within a few miles of the project area, large villages such as the site at Maidu Regional Park are not uncommon. Some villages are along smaller drainages such as Pleasant Grove Creek.

ETHNOGRAPHIC BACKGROUND

The project site is within the area of the Nisenan or sometimes referred to as the Southern Maidu. The Nisenan are part of the Penutian linguistic family. They occupied the area around the drainages of the Yuba, Bear and American Rivers, with the western boundary at the Sacramento River and the eastern boundary at the crest of the Sierra Nevada (Wilson and Towne 1978, pp. 387-397).

There were several political divisions within the Nisenan territory. One center was at the mouth of the American River, one at the mouth of the Bear, one at the mouth of the Yuba, one near Placerville, and one in the ridges between the Bear and the middle fork American River (Wilson and Towne 1978, pp. 387-397).

The Nisenan area provided abundant food resources. Food gathering usually followed a seasonal round, i.e. following the foods as they ripened. Hunting and fishing provided a year round diet base, but was concentrated in the late summer and early fall. Trade with valley groups and the Washo provided a wider variety of diet and materials such as shell beads, magnesite, steatite and obsidian (Wilson and Towne 1978, pp. 387-397).

Villages were typically a group of dome or conical houses varying from three to seven houses to forty to fifty houses. Dance houses were at major villages. Spanish explorers crossed Nisenan territory in the early 1800s. Trappers from the Hudson Bay Company were trapping and establishing camps within Nisenan territory. Village

populations were greatly diminished by the epidemic of 1833. The discovery of gold in Coloma within Nisenan territory by Euro-Americans started a massive migration of new people into Nisenan country (Wilson and Towne 1978, pp. 387-397).

HISTORIC SETTING

Euro-Americans began entering into this part of California in the late 1700s to early 1800s, first as explorers and then as trappers. The biggest change to this area occurred when floods of new immigrants arrived in the years following the discovery of gold in the middle 1800s. The area became overrun and to a great extent overturned by the gold seekers in the area previously occupied by the Nisenan (Wilson and Towne 1978, pp. 387-397).

The gold rush only lasted a few years in this area and ranching quickly became the dominant business. During the mid 1860s and 1870s sheep ranching was a major enterprise and ranchers owned large tracks of land. The completion of the transcontinental railroad in 1864 provided transport for the ranch products to the markets to the east. Roseville became a major shipping and trading center, becoming the largest freight yards west of the Mississippi by the 1920s (G&B 2003a).

The Fiddyment Ranch was one of the large agricultural/ranching enterprises in the area. This ranch operated for over 125 years, from the 1870s until today. The ranch produced sheep, cattle, turkeys and other agricultural products. Many of the ranch buildings still remain on the property (G&B 2003a).

RESOURCES INVENTORY

Literature and Records Search

The City of Roseville conducted a record search at the North Central Information Center of the California Historical Resources Information System (CHRIS) at California State University, Sacramento on July 31, 2003. The search included an area 0.5 mile around the power plant site and the linear facility routes. Seventeen cultural resource surveys had been conducted within this area since 1979. Eight of the surveys are current (conducted within the last five years). Nineteen resources have been recorded as a result of the surveys. The applicant also consulted lists of historic resources maintained by local municipalities (Roseville 2003a, p. 8.3-9, Table 8.3-1 and Table 8.3-2). Local historical and archeological societies were contacted regarding their knowledge of local resources (CH2MHill 2004a, p. CR-5). Recorded resources are listed in Table 1. The prior surveys covered the plant site and nearly the entire natural gas pipeline route.

Table 1: Previously recorded cultural resources within record search area and project component.

Primary Number or Trinomial	Report Citation	Site type	Project Component
P-31-0263 CA-PLA-137	URS Corp. & Mott, J. B.	Historic/Prehistoric	Gas Pipeline Alternative A
P-31-0199 CA-PLA-073	Mott, J. B.	Prehistoric	Gas Pipeline Alternative A
P-31-0855 CA-PLA-729	Peak & Assoc.	Prehistoric	Gas Pipeline Alternative A
P-31-0856 CA-PLA 730	Peak & Assoc.	Ruin, Pleasant Grove School	Gas Pipeline Alternative A
P-31-1219	PAR 2001	Road	Gas Pipeline Alternative A
P-31-1222 CA-PLA-969	PAR 2001	Ruins	Gas Pipeline Alternative A
P-31-1224	PAR 2001	Structure	Gas Pipeline Alternative A
P-31-1225	PAR 2001	Fiddyment Ranch Barn	Gas Pipeline Alternative A
P-31-1227	PAR 2001	Turkey Brooding Shed	Gas Pipeline Alternative A
P-31-1228	PAR 2001	Turkey Farm Complex	Gas Pipeline Alternative A
P-31-1229	PAR 2001	Pumphouse	Gas Pipeline Alternative A
P-31-1590	Dames & Moore	Grave	Gas Pipeline Alternative A
P-31-1215	PAR 2001	Structure pad/artifact scatter	Gas Pipeline Alternative D
P-31-1216	PAR 2001	Dump site	Gas Pipeline Alternative D
P-31-1218	PAR 2001	Windmill parts	Gas Pipeline Alternative D

Native American Contacts

As part of the background research for the project, the applicant contacted the Native American Heritage Commission (NAHC) via letter dated October 1, 2003, requesting information on sacred lands and ethnographically important sites and other properties that might be located in or near the project site or its components, as well as a list of Native American contacts with potential knowledge of the area. The NAHC responded on October 10, 2003 that they had no sacred sites listed in their data base and provided a list of five Native American contacts. The applicant contacted all of the Native American contacts via letter dated October 16, 2003.

The applicant received one response from the United Auburn Indian Community requesting a copy of a field survey and record search be prepared by a qualified

archeologist. The applicant sent a copy of the survey report to the United Auburn Indian Community after the preparation of the Preliminary Staff Assessment. Staff spoke to Shelly McGinnis, a representative of the United Auburn Indian Community, on September 2, 2004. They had read the survey report and were not concerned about the resources that the report indicated would be impacted. They were not aware of other resources in the area of the project and had no further concerns. Staff relayed information about the proximity of CA-PLA-137 to the project area and the mitigation measures required to ensure there would be no unmitigated impact. Ms. McGinnis said that she thought the mitigation measures were appropriate.

Staff also requested a list of interested Native Americans from the NAHC. In November of 2003, letters were sent to all of the interested Native Americans. No responses have been received.

Field Surveys

Power Plant Site

The power plant site had been previously surveyed. No cultural resources were found on the project site. No new surveys were conducted.

Natural Gas Pipeline

The AFC analyzed three gas line alternatives: A, B, and C. In October of 2004, RE provided alternative D for the gas line and stated that alternatives B, B1, and C are no longer considered as part of the project.

Alternate A

Portions of the natural gas pipeline alternatives along the road shoulder of Baseline Road on the south side between PG&E Line 123 (500 feet east of Country Club Lane) and Fiddyment Road, an area on the east side of Fiddyment Road south of the power lines to Pleasant Grove Boulevard and along the north side of Pleasant Grove Boulevard to Sun City Boulevard were inventoried by pedestrian survey. After the WRSP was authorized, the project description was changed to only consider Alternative A as the gas pipeline route. No new resources were discovered as a result of the survey.

Alternate D

Alternative D begins near the corner of the future location of Pleasant Grove Boulevard and the future West Side Drive and travels north about 1.2 miles to Philips Road running in a 35 foot wide utility easement identified in the WRSP. At Philip Road, the pipeline turns east, running in the road to the southeast corner of the power plant site. This is all within an area surveyed in 2001 by PAR Environmental Services, Inc. PAR had recorded three locations of historical materials, but felt they were so limited in materials and information values that they only required a DPR 523 Primary Form and would not meet eligibility requirements for the NRHP or the CRHR.

CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize cultural resources by determining whether they meet sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the cultural resources and the methods and consultation required to mitigate any such impacts. Federal laws apply when a federal agency takes an action. A U.S. Corp of Engineers Section 404 permit would be required.

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are assessed as "significant" in accordance with federal guidelines need to be considered in analyzing potential impacts. The significance of historical and prehistoric cultural resources is based on the criteria for eligibility for nomination to the NRHP as defined in Title 36, Code of Federal Regulations, section 60.4. If such resources are determined to be significant, and therefore eligible for listing in the NRHP, they are afforded certain treatment under the National Historic Preservation Act. If the resources are determined to be significant, and therefore eligible for the CRHR and the project would impact these resources, then mitigation measures are implemented under CEQA to reduce the impact to less than significant if possible. Federal agencies are responsible for meeting the requirements of NHPA and the Energy Commission is responsible for meeting the requirements of CEQA.

The National Register criteria state that "eligible historic properties" are: districts, sites, building, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:

a) are associated with events that have made a significant contribution to the broad patterns of our history; or
b) that are associated with the lives of persons significant in our past; or
c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
d) that have yielded, or may be likely to yield, information important to history or prehistory.

California has adopted a similar set of criteria for assessing resources for the California Register of Historical Resources. The CRHR criteria are noted as 1, 2, 3, and 4 while the NRHP criteria are noted as a, b, c, and d.

Under federal law, cultural resources determined not to be significant and that do not meet the eligibility criteria for the NRHP are subject to recording and documentation only and are afforded no further treatment. However, occasionally certain resources, although they may not be assessed as "significant," may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Energy Commission staff and involved federal agencies evaluate the survey reports and site records for any known resources located within or adjacent to the project's Area of Potential Effects (APE) to determine whether they meet the eligibility criteria.

The record and literature search and the pedestrian surveys of the proposed project were conducted to identify the presence of any cultural resources. Where cultural resources were identified, additional evaluation was conducted to determine whether the resources are already listed on, or are potentially eligible for listing on either the NRHP [36 CFR 800] or the CRHR.

CEQA Guidelines explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project will affect "historical resources" (Cal. Code Regs., tit. 14. §15064.5). The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination (Cal. Code Regs., tit. 14 § 15064.5). These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project will cause a "substantial adverse change in the significance of the historical resource," which the regulation defines as a significant effect on the environment Cal. Code Regs., tit. 14 § 15064.5.

CEQA also contains a section addressing "unique" archeological resources and provides a definition of such resources (PRC, § 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of an historical resource (Cal. Code Regs., tit. 14 § 15064.5).

ANALYSIS AND IMPACTS

Since project development and construction usually entail surface and subsurface disturbance, the proposed REP has the potential to adversely affect both known and unknown cultural resources. Staff has analyzed the potential direct, indirect, and cumulative impacts from the proposed project. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation or demolition. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources will not be encountered and that impacts will therefore not occur.

Resources have only been identified in the vicinity of the linear facilities associated with the project. The construction of the natural gas pipeline requires a trench from between three feet wide to 12 feet wide with another ten to fifty feet width required for equipment access. Bore or drilling pits will be necessary at entry and exit areas where the pipeline goes under existing roads or under Kaseberg Creek. Table 2 indicates the resource proximity to project components and the determination of eligibility made by the City of Roseville in the West Roseville Specific Plan. All of the resources that have been determined to be ineligible for meeting the requirements listing on the California Register of Historic Places will no longer be considered in this analysis.

CA-PLA-137 (P-31-0263) is located approximately 200 feet from the alignment for the natural gas pipeline route. The site was originally recorded in 1961. The record noted that cultural materials were unearthed during agricultural plowing. URS Corporation updated the record in 2001 indicating that heavy grass cover obscured native soils. Surface vegetation was scraped back in several locations revealing dark soils, but no cultural materials on the surface. The site was not tested or evaluated by URS Corporation or the WRSP.

Additional survey was conducted by Dr. Douglas Davy of CH2M Hill and Gary Reinoehl, Energy Commission staff, on June 24, 2004 in the area of CA-PLA-137. Ground cover was dense in most areas. Additional surface inspection and surface scrapes were conducted in the area to determine if surface remains could be located. Only one artifact was located during this survey and it could not clearly be linked to the recorded site. No cultural resource materials were found within the project site or near the natural gas pipeline Alternative A.

Table 2: Proximity of resource to project components and eligibility from WRSP.

Primary Number or Trinomial	Distance from project component	CRHR Eligibility WRSP
P-31-0263./ CA-PLA-137	~200 feet from natural gas pipeline A	Not Addressed
P-31-0199 / CA-PLA-073	~850 feet from natural gas pipeline A	Outside WRSP & remainder area
P-31-0855 / CA-PLA-729	~1300 feet from natural gas pipeline A	Outside WRSP & remainder area
P-31-0856 / CA-PLA 730	~200 feet from natural gas pipeline A	Outside WRSP & remainder area
P-31-1219	~1320 feet from natural gas pipeline A	Ineligible
P-31-1222 / CA-PLA-969	~1200 feet from natural gas pipeline A	Ineligible
P-31-1224	~1000 feet from natural gas pipeline A	Ineligible
P-31-1225	~1000 feet from natural gas pipeline A	Ineligible
P-31-1227	~500 feet from natural gas pipeline A	Ineligible
P-31-1228	In alignment of natural gas pipeline A	Ineligible
P-31-1229	~1000 feet from natural gas pipeline A	Ineligible
P-31-1590	~200 feet from natural gas pipeline A	Ineligible
P-31-1215	~500 feet from natural gas pipeline D	Ineligible
P-31-1216	~400 feet from natural gas pipeline D	Ineligible
P-31-1218	~350 feet from natural gas pipeline D	Ineligible

NA = not assessed

CA-PLA-073 and CA-PLA-729 are both over 500 feet from the linear components. The project description does not describe any activities that would occur this far from the components. The sites will not be considered in this analysis because of the distance from the components.

CA-PLA-730 is about 100 feet east of Fiddyment Road in a developed community. Construction of the pipeline alternative in this area is planned for the west side of Fiddyment Road and no impacts from the project are expected to occur in this developed community. The project description does not indicate any activities that would occur in this area. The site will not be considered in this analysis because of its location in relation to Fiddyment Road and the proposed linear component.

PROJECT SPECIFIC IMPACTS

Only impacts to eligible cultural resources sites can be potentially significant. The Fiddyment Ranch Main Complex (P-31-1223 / CA-PLA-970) was determined to “meet California and National Register Criterion 1, 3 and 4” by the City of Roseville in the WRSP. Although construction impacts are not planned for the area where this resource is located, the power plant and the visible water vapor plumes from the cooling tower and heat recovery steam generator (HRSG) exhaust stacks will change the setting, feeling and association of this historical resource. The largest plumes would occur during peaking operation and represents the worst case situation. Plumes during peaking operation having a range of length approximately 2,700 to 3,000 feet will be

visible one percent of the “clear” hours. Plumes during peaking operation having a range of length approximately 390 to 456 feet will be visible 10 percent of the “clear” hours. Please refer to the **Visual Resources** section for details on the modeling for the “clear” hours cooling tower plume dimensions.

The WRSP states that the Fiddyment Ranch Main Complex would be preserved as a community facility for future use by the City of Roseville. Preservation would be assured through three mitigation measures: MM 4.8-4(a)-retain Fiddyment Ranch Main Complex in current location, or (b) retain portions of the Fiddyment Ranch Main Complex; MM 4.8-5-record historically significant resources; and MM 4.8-6-rehabilitate and reuse historically significant properties. However, further discussion indicates those portions or all of the Fiddyment Ranch Main Complex may be moved or demolished, stating, “it is not certain which buildings specifically will remain and which buildings may be removed.” The plan suggests that if buildings are removed they would be barns or outbuildings, resulting in significant and unavoidable impact. Certainly, the removal of any of the barns or outbuildings would result in further loss of integrity for design, materials and workmanship. Even recordation of these resources would not fully recover the values of the Fiddyment Ranch Main Complex under criterion 1.

The WRSP allows development of lands around the Fiddyment Ranch Main Complex. The first phase of development includes much of the land around the Fiddyment Ranch Main Complex. The development around the Fiddyment Ranch Main Complex will alter the setting, feeling and association of this historical resource to a significant degree. The ranch will no longer be associated with the open undeveloped rural ranch property, isolating it into an urban setting with other buildings, streets and parking areas surrounding the structures. The ranch buildings would still retain a high degree of integrity of location, design, materials, and workmanship. Modern housing exists about 0.75 mile to the east and a newly completed sewage treatment plant is less than 375 feet to the west. The power plant is proposed to be about 0.25 mile to the northwest of the Fiddyment Ranch Main Complex and is a relatively small facility compared to the housing, the waste water treatment plant and the first phase of development allowed by the WRSP. The plumes will be the most visible manifestation of the power plant approximately 25 percent of the “clear” hours. The additional diminishment of the setting, feeling, and association caused by the construction of REP and the associated plumes would not be sufficient to materially impair the Fiddyment Ranch Main Complex.

Impacts could occur to CA-PLA-137 as a result of the proposed project. Current attempts to locate the resource and its relationship to the project have been unsuccessful. If during clearing, testing or construction, CA-PLA-137 is discovered to be in the gas pipeline route Alternative A, then the site would have to be evaluated for the CRHR. If CA-PLA-137 is eligible for the CRHR, then data recovery or other mitigation measures would need to be conducted before construction could continue within the boundary of CA-PLA-137.

Energy Commission staff have not received any additional comments or information from Native Americans regarding important resources within the project area.

CUMULATIVE IMPACTS

The proposed project would cause an incremental diminishment of the setting, feeling, and association of the Fiddyment Ranch Main Complex, but its contribution to the cumulative impact on the Fiddyment Ranch Main Complex would not, by itself, result in a cumulatively considerable or significant impact because the WRSP states that even with mitigation, the WRSP will result in a significant and unavoidable impact to the Fiddyment Ranch that can not be mitigated to less than significant.

FACILITY CLOSURE

At the time of planned closure, all then-applicable LORS will be identified and the closure plan required by the Energy Commission will address compliance with these LORS. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no conclusion can be drawn at this time with respect to the impact of facility closure on cultural resources. The closure plan, when created, will address impacts to cultural resources.

A temporary closure should have no impacts on cultural resources as long as no additional lands are needed for the closure. A contingency plan for temporary cessation of operation would be implemented that would ensure compliance with all applicable LORS.

If a site were abandoned, impact to cultural resources would be unlikely because there would be no immediate soil disturbances. Over time, depending on the need to disturb the ground to accomplish project closure and facility removal, some disturbance of known and/or previously unknown cultural resources might result.

COMPLIANCE WITH APPLICABLE LORS

Placer County and the City of Roseville have policies and goals for the protection of cultural resources, but have no specific procedures for implementation of CEQA that differ from procedures used by the Energy Commission. The power plant site is owned by the City of Roseville and the linear facilities are within the area encompassed by the WRSP. The WRSP requirements are consistent with CEQA and the proposed conditions of certification. Implementation of the mitigation measures recommended in the conditions of certification will ensure compliance with state and local LORS.

MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often however, avoidance cannot be achieved and other measures such as surface

collection, subsurface testing, and data recovery must be implemented for archaeological resources and documentation must be implemented for historical structures. Mitigation measures are developed to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION

REP recommends that a Cultural Resources Specialist (CRS) and Archeological Monitor (AM) would be retained. The CRS would conduct a worker education session for construction supervisory personnel covering the importance and legal protection of significant archeological resources. The monitor would observe mechanical excavation in high sensitivity areas such as areas on or near stream terraces. If archeological resources are identified during construction the AM, CRS and construction superintendent will be notified and construction in that area will be halted, if necessary. The CRS will delineate the area where construction is halted. Construction will remain halted until the CRS, in consultation with the Energy Commission staff, inspect and evaluate the discovery. If human remains are found, project officials will follow state law. The CRS and AM will record all discoveries on Department of Parks and Recreation Form 523.

STAFF'S PROPOSED MITIGATION MEASURES

Archeological site CA-PLA-137 could be impacted by the project and has not been evaluated. Other archeological deposits could be discovered during construction of the power plant and the associated linear facilities. Staff's proposed conditions of certification are consistent with applicant's proposed mitigation measures. The applicant's measures are incorporated into staff's proposed conditions of certification **CUL-1** through **CUL-7** presented below.

Staff's proposed conditions require implementation of the following measures:

CUL-1 requires that a qualified cultural resources specialist (CRS) manage cultural resources activities for the project. It also ensures that additional qualified specialists or cultural resources monitors would be retained as needed for the project. To ensure that cultural resources are adequately protected, **CUL-1** requires that the CRS have three years of experience in California. In addition to other relevant types of experience, the condition requires that the CRS have some background in data recovery. The condition also requires monitors to have experience and familiarity with cultural resources and artifacts found in California.

CUL-2 requires the project owner to provide the CRS with maps and construction schedule information necessary to schedule monitors and cultural resources activity at the project site.

CUL-3 requires that a Cultural Resources Monitoring and Mitigation Plan (CRMMP) is developed that details all required activities that must be completed in order to reduce the impacts to a level that is less than significant. The CRMMP defines the roles and responsibilities of cultural resources personnel and provides timelines for the completion of the required mitigation. The CRS would also obtain Native American monitors to observe work in areas where Native American artifacts are found. The CRMMP

requires a discussion of curation specifications, materials to be transferred to a curation facility, and the responsibility of the owner to pay all curation fees.

CUL-4 requires that the project owner provide a Cultural Resources Report (CRR) in Archaeological Resource Management Report (ARMR) format. This report would provide information on all field activities and the findings. The CRR would include all Department of Parks and Recreation (DPR) 523 forms and cultural resource reports not previously provided to the California Historic Resource Information System (CHRIS). Copies of the CRR would be provided to the State Historic Preservation Officer (SHPO), the CHRIS and the curating institution (if archaeological materials were collected).

CUL-5 provides for worker environmental training. The training serves to instruct workers that halting construction is necessary if a potential cultural resource is discovered. It also provides them with instruction regarding applicable laws, penalties and reporting requirements in the event something is discovered. Workers are also instructed that the CRS and other cultural resources personnel have the authority to halt construction in the event of a discovery.

CUL-6 requires monitoring, including by Native American monitors where appropriate, of the ground disturbance for the project, linear facilities, and ancillary areas and a process for reducing monitoring to a level below full time. It also requires monitoring logs and weekly summaries of the monitoring activities. All non-compliance issues have to be reported to the CPM, and a reporting process is required. **CuI-6** ensures that unanticipated impacts to cultural resources are identified.

CUL-7 requires notification of staff within 24 hours of a cultural resources find. Timely notification enables staff participation in determinations of significance and the selection of appropriate mitigation to lessen impacts on cultural resources to a level that is less than significant.

The CRS, alternate CRS and the CRMs have the authority to halt work so that the Applicant has flexibility in construction scheduling. The CRS does not have to be at all active areas of construction at the same time.

RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

The City of Roseville provided comments on the Preliminary Staff Assessment on July 16, 2004.

Comment: Roseville Energy (RE) requested that the requirement in condition of certification **CuI-1** that the requirements for the Cultural Resources Monitor (CRM) be changed from specifying experience in California to specifying experience in North America. They stated that they felt that requiring experience in California is unnecessarily restrictive because archeological deposits are sufficiently similar appearing throughout North America that a trained monitor would recognize a buried deposit.

Response: The requirements for the CRM vary in a proportional manner with education and field experience. The minimum field experience for a monitor is one year in California. Although there are many similarities in many types of archeological deposits in North America, monitors must have experience that is relevant to each project area. Artifacts found in deposits vary considerably and may reflect local Native American or historic period traditions. Monitors must be able to identify artifacts, manuports, and human modified materials that could be found in the area of the proposed facility. The requirement for experience in California is necessary because of the unique nature of some Native American cultural remains and the broad range of historic cultural groups (Russian, British, French, Hawaiian, Spanish, and Mexican). For example, the use of clay nodules in place of cooking stones may well be missed by some one not familiar with local traditions.

CRMs may be working closely with Native American monitors. The CRM needs to have an understanding of the culture and sensitivities of local Native American groups. Again, California experience is necessary to develop this familiarity.

Since there are about 1,000 members in the Society for California Archeology, it would not appear to be burdensome for the Applicant to find individuals meeting the qualifications for the CRM required in **Cul-1**.

Comment: RE requested that Cul-3 be deleted. They proposed to submit a CRMMP prior to the Final Staff Assessment, making the condition unnecessary.

Response: Staff would prefer to have an agreed upon CRMMP prior to the permitting of the project, but has no mechanism to require such a document except through the conditions of certification. If for some reason the CRMMP was not revised during the siting phase to the degree that staff could approve, there would be no authority for the Commission to require submission or implementation of a CRMMP post-certification. Condition Cul-3 must be retained to ensure the preparation, approval and implementation of a CRMMP.

Staff has received a CRMMP from the applicant. Staff has started the review of the CRMMP and will provide comments to the RE CRMMP. The CRMMP can not be approved as it is written. Staff will use email and other means of communication to comment on the CRMMP and to ensure that the CRMMP is in conformance with all LORS and professional standards. The CRMMP could be approved through the compliance process in accordance with Cul-3 as soon as the project is certified.

On August 18, 2004 the City of Roseville provided a list of conditions that would need to be fulfilled to be consistent with local LORS. None of the conditions specifically address cultural resources. However, actions taken to fulfill two of the conditions could result in impacts to cultural resources.

Condition 14: For all work to be performed off-site, permission to enter and construct shall be obtained from the property owner, in the form of a notarized right-of–way. Said notarized right-of-way entry shall be provided to engineering prior to approval of any plans.

Response: The Energy Commission usually refers to the parcel where the energy facility is proposed as the project site. Off-site work would be any areas required for the project that are not within the project site. If the off-site work is to occur in areas other than the natural gas pipeline described in the Project Description, then this would represent a change in the Project Description. Changes in the Project Description require an assessment through the Energy Commission compliance process.

Condition 16: a note shall be added to the grading plans that states:

> "Prior to the commencement of grading operations, the contractor shall identify the site where the deficit earthen material shall be borrowed. A repot issued by a geotechnical engineer shall be submitted to verify that the imported materials are suitable for fill. If the borrow site is within the City of Roseville, the contractor shall show proof of all approved grading plans. Haul routes to be used shall be specified."

Response: If borrow material is to be obtained from areas that are outlined in the project description or from a commercial borrow area, then environmental impacts have been considered either through this assessment or through the permitting of a commercial borrow facility. If the area where materials would be obtained are in areas other than the project site or the natural gas pipeline described in the Project Description, then this would represent a change in the Project Description. Changes in the Project Description require an assessment through the Energy Commission compliance process.

CONCLUSIONS AND RECOMMENDATION

No known archeological resources would be impacted by the Roseville Energy Park. All current cultural resource surveys have not been able to relocate CA-PLA-137 and determine if it is within the impact area. Ground disturbing activities could impact CA-PLA-137. If CA-PLA-137 is impacted by project activities, then the resources would have to be evaluated to determine if it meets the eligibility requirements for the CRHR. If a resource meets the eligibility requirements, then mitigation measures would be developed to reduce the impacts to less than significant. Staff's proposed Conditions of Certification **Cul-1** through **Cul-7** would reduce the impacts to buried archeological resources to less than significant if any are discovered during construction.

The Fiddyment Ranch is within the impact area and has been determined to meet the criteria for eligibility to the California Register of Historical Resources in the WRSP. The plumes from the plant would have an impact on the Fiddyment Ranch because the plumes would change the setting and feeling as aspects of the resources integrity. The first phase of development includes much of the land around the Fiddyment Ranch Main Complex. The first phases of the WRSP would result in a significant change in the setting and feeling of the Fiddyment Ranch. This change has been identified in the WRSP as significant and unmitigatible. The impact from the plant would not be significant because the plant and the visible plumes would not alter the setting, feeling and association to such a degree that the eligibility of the ranch would be materially

impaired. In addition, the setting, feeling and association would already be significantly altered by the build out of the WRSP.

If staff's proposed conditions of certification are properly implemented, the project would comply with applicable laws, ordinances, regulations, and standards for cultural resources and any impacts would be reduced below a significant level. In the event previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner, then the project owner would notify the Energy Commission in accordance with **Cul-7**. Mitigation measures required under **Cul-7** would reduce the impacts to less than significant and ensure compliance with applicable laws, ordinances, regulations, and standards.

Staff recommends that the Commission adopt the following proposed conditions of certification, which incorporate the mitigation measures discussed above.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance, the project owner shall obtain the services of a **Cultural Resources Specialist (CRS)**, and one or more alternates, if alternates are needed, to manage all monitoring, mitigation and curation activities. The CRS may elect to obtain the services of **Cultural Resource Monitors (CRMs)** and other technical specialists, if needed, to assist in monitoring, mitigation and curation activities. The project owner shall ensure that the CRS evaluates any cultural resources that are newly discovered or that may be affected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR). No ground disturbance shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM. The CRS will be accepted on a provisional basis until the CRMMP required in Cul-3 is approved. Approval of a CRS may be denied or revoked for non compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resume for the CRS and alternate(s) shall include information demonstrating that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published in the Code of Federal Regulations, 36 CFR Part 61 are met. In addition, the CRS shall have the following qualifications:

1. The technical specialty of the CRS 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 shall demonstrate that the CRS has the appropriate education and experience to

accomplish the cultural resource tasks that must be addressed during ground disturbance, grading, construction and operation. In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM that the proposed CRS or alternate has the appropriate training and background to effectively implement the conditions of certification.

CULTURAL RESOURCES MONITOR

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historic archaeology or a related field and one year experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historic 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, historic 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. historic archeologist, historian, architectural historian, physical anthropologist shall be submitted to the CPM for approval.

The project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval at least 45 days prior to the start of ground disturbance.
At least 10 days prior to a termination or release of the CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval.

At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRM, at least five days prior to the CRM beginning on-site duties. 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.

At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for on-site work and is prepared to implement the cultural resources conditions of certification.

CUL-2 Prior to the start of ground disturbance, the project owner shall 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 individual artifacts. 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.

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. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

1. The project owner shall submit the subject maps and drawings at least 40 days prior to the start of ground disturbance. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.
2. If there are changes to any project related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.
3. If project construction is phased owner shall submit the subject maps and drawings, if not previously provided, 15 days prior to each phase.
4. A current schedule of anticipated project activity shall be provided to the CRS on a weekly basis during ground disturbance and also provided in each Monthly Compliance Report (MCR).
5. The project owner shall provide written notice of any changes to scheduling of construction phases within five days of identifying the changes.

CUL- 3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or its preparation overseen by the CRS, to the CPM for approval. 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 manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures.

1. A proposed research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A

refined research design will be prepared for any resource where data recovery is required. A programmatic treatment plan may be included in the CRMMP for limited resources types.

2. The following statement shall be added to 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. If there appears to be a discrepancy between the conditions and the way in which they have been summarized, described, or interpreted in the CRMMP, the conditions, as written in the Final Decision, supercede any interpretation of the conditions in the CRMMP. (The Cultural Resources Conditions of Certification shall be attached as an appendix.)
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 discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.
6. A discussion of all 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 discussion 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 discussion of the requirement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped (may include photos). 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. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.
8. A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding shall be met. If archaeological materials are to be curated, the name and phone number of the contact person at the institution. This shall include information indicating that the project owner will pay all curation fees and state that any agreements

concerning curation will be retained and available for audit for the life of the project.

9. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.

~~10.~~ A discussion of the proposed Cultural Resource Report (CRR) which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

The project owner shall submit the subject CRMMP at least 30 days prior to the start of ground disturbance. Per ARMR Guidelines the author's name shall appear on the title page of the CRMMP. Ground disturbance activities may not commence until the CRMMP is approved, unless specifically approved by the CPM. A letter shall be provided to the CPM indicating that the project owner would 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 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 analysis. All survey reports, Department of Parks and Recreation (DPR) 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR. If the ARMR reports have previously been sent to the CHRIS, then receipt letters from the CHRIS shall be included in an appendix.

The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). 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).

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be conducted by the CRS and may be presented in the form of a video. The CRS shall be available (telephone or in person) to answer questions posed by employees. The CRS shall provide a draft of the training text and graphics to the CPM for review and approval. 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. Information that the CRS, alternate CRS, and CRMs have the authority to halt construction to the degree necessary, as determined by the CRS, in the event of a discovery or unanticipated impact to a cultural resource;

4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery, and shall contact their supervisor and the CRS or CRM; and that redirection of work would be determined by the construction supervisor and the CRS;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. An acknowledgement form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Thirty days prior to the beginning of site mobilization, the project owner shall provide the CRS draft text and graphics for the training program. The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form 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 shall monitor ground disturbance full time in the vicinity of the project site, linears and ground disturbance at laydown areas or other ancillary areas to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter or e-mail providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval prior to any reduction in monitoring.

CRMs shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

The CRS and the project owner shall notify the CPM by telephone or e-mail of any incidents of non-compliance with the conditions of certification and/or applicable LORS upon becoming aware of the situation. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification.

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 of certification.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be 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.

During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter or e-mail identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval. Documentation justifying a reduced level of monitoring shall be submitted to the CPM at least 24 hours prior to the date of planned reduction in monitoring.
During the ground disturbance phases of the project, the project owner shall include in the MCR to the CPM copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained and made available for audit by the CPM.

Within 24 hours of recognition of a non-compliance issue with the conditions of certification and/or applicable LORS, the CRS and the project owner shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. The telephone call shall be followed by an e-mail or fax detailing the non-compliance issue and the measures necessary to achieve resolution of the issue. Daily logs shall include forms detailing any instances of non-compliance. In the event of any non-compliance issue, a report written no sooner than two weeks after resolution of the issue that describes the issue, resolution of the issue and the effectiveness or the resolution measures, shall be provided in the next MCR.

One week prior to ground disturbance in areas where there is a potential to discover Native American artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS and the CRMs in the event previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner (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 are found or impacts can be anticipated, construction shall be the halted or redirected and shall remain halted or redirected until 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 and the project owner have consulted with the CPM and the CPM has concurred with the recommended eligibility of the discovery and proposed data recovery or other mitigation; and
3. Any necessary data recovery and mitigation has been completed.

At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS and CRMs have the authority to halt construction activities in the vicinity of a cultural resource 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.

REFERENCES

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. Submitted to the Docket on February 6, 2004

CH2MHill, Sacramento, California (CH2MHill) 2004b. Applicant's Response to CEC staff Data Request 55 – Storm Water Pollution Prevention Plan for Construction. Submitted to the Docket on February 19, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004d. Applicant's Response to CEC staff Data Request 57 – Spill Prevention, Control, & Countermeasures Plan for Operation. Submitted to the Docket on February 24, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004e. Applicant's Responses to CEC Data Requests 70-71. Submitted to the Docket on March 1, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004g. Responses to CEC questions regarding the Screening Study dated June 24, 2003. Submitted to the Docket on March 4, 2004.

Galati & Blek, Sacramento, California (G&B) 2003a. Application for Confidential Designation and Table 8.1G-1, the November 24, 2003 Updated ERC Table. Submitted to the Docket on November 24, 2003.

Moratto, Michael J. 2004. *California Archaeology.* Contributions by David A. Fredrickson, Christopher Raven, and Claude N. Warren. Coyote Press (reprinted), Salinas.

Roseville Electric, Roseville, California (Roseville) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

Roseville Electric, Roseville, California (Roseville) 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

Wilson, Norman L. and Arlenen H.Towne 1978. Nisenan. In: *Handbook of North American Indians*, Vol. 8, California, edited by Robert F. Heizer, pp. 350-360. Smithsonian Institution, Washington, D.C.

HAZARDOUS MATERIALS MANAGEMENT

Testimony of Geoffrey Lesh, P.E. and Rick Tyler

INTRODUCTION

The purpose of this staff analysis is to determine if the proposed Roseville Energy Park (REP) project complies with applicable laws, ordinances, and regulations (LORS), and has the potential to cause significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Staff's **Worker Safety and Fire Protection** analysis portion of this document describes the requirements applicable to the protection of workers from such risks.

The only hazardous material that would be stored at the REP in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is aqueous ammonia (28 percent ammonia in water). The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the more hazardous anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain and emissions are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, would be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project also involves the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. This pipeline would be approximately 6 miles in length (involving the construction and operation of one new compressor station).

The REP would also require the transportation of aqueous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

LAWS, ORDINANCES, REGULATIONS, STANDARDS, AND POLICIES

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

FEDERAL

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

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Accidental Release Prevention Program (Cal-ARP), implemented pursuant to Health and Safety Code, section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This program supersedes the California Risk Management and Prevention Plan.

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

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

Title 8, California Code of Regulations, section 458 and sections 500 – 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer anhydrous ammonia. These sections generally codify the requirements of several industry codes, including the ASME Pressure Vessel Code, ANSI K61.1 and the National Boiler and Pressure Vessel Inspection Code. While these

codes apply to anhydrous ammonia, they may also be used to design storage facilities for aqueous ammonia.

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

Gas Pipeline

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

- Class 1: Pipelines in locations within 220 yards of ten or fewer buildings intended for human occupancy in any 1-mile segment;
- Class 2: Pipelines in locations within 220 yards of more than ten but fewer than 46 buildings intended for human occupancy in any 1-mile segment. This class also includes drainage ditches of public roads and railroad crossings;
- Class 3: Pipelines in locations within 220 yards of more than 46 buildings intended for human occupancy in any 1-mile segment, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (the days and weeks need not be consecutive); and
- Class 4: Pipelines in locations within 220 yards of buildings with 4 or more stories above ground in any 1-mile segment.

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

- Title 49, Code of Federal Regulations, Part 190 outlines the pipeline safety program procedures;
- Title 49, Code of Federal Regulations, Part 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, requires operators of pipeline systems to notify the U.S. Department of Transportation of any reportable incident by telephone and then submit a written report within 30 days;
- Title 49, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use which characterize the surrounding

land. This part contains regulations governing pipeline construction, which must be, followed for Class 2 and Class 3 pipelines.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC 2000) contains provisions regarding the storage and handling of hazardous materials in Articles 4 and 79. The most recent version of the UFC was adopted in 2000.

The City of Roseville Fire Department is the designated Certified Unified Program Authority (CUPA) and is responsible for administering Hazardous Materials Business Plans, Hazardous Materials Management Plans, Spill Prevention, Control, and Countermeasure Plans and RMP's (CH2MHill 2004d).

SETTING

The proposed REP site is located on approximately 12 acres of a portion of a 40-acre parcel, owned by the City of Roseville in southwestern Placer County, located approximately 5 miles northwest of downtown Roseville, and about 18 miles northeast of the City of Sacramento. Site topography is characterized as generally flat with rolling foothills and the Sierra Nevada Mountains to the east, and the Sacramento Valley extending to the north, west and south. The terrain elevation is approximately 95 feet above mean sea level. The overall terrain in the vicinity slopes downward in a westward direction toward the Sacramento Valley. At present, the area surrounding the site is generally undeveloped with some agricultural uses. See **Project Description** portion of this document for more details.

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

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

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the level of public exposure to such materials and the associated health risks. When wind speeds are low and stable, dispersion is severely reduced and can lead to increased localized public exposure in the event of an accidental release.

Recorded wind speeds and ambient air temperatures are described in the **Air Quality** section of the AFC (REP 2003, Section 8.1). Staff agrees with the applicant's use of F stability (stagnated air, very little mixing), 1.5 meters/second wind speed, and an ambient temperature of 111^{o} F in its modeling analysis of an accidental release of

aqueous ammonia. This is an extremely conservative scenario and reflects worst-case atmospheric conditions (CH2MHILL 2004a).

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The terrain in the vicinity of the site gradually slopes downhill from east to west. To the east, the terrain rises approximately 150-feet in 5 miles.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. The locations of sensitive receptors in the project vicinity are shown in Figure 8.9-2 of the AFC. There are no sensitive receptors within a 2-mile radius. There are no existing or planned schools within a quarter mile of the project site.

ENVIRONMENTAL IMPACTS

Staff reviewed and assessed the potential for the handling and use of hazardous materials during both construction and operations to impact the surrounding community. All chemicals proposed for use at the REP, as well as natural gas, were evaluated.

METHODOLOGY

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

Staff conducted a review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant (Roseville 2003a, Section 8.5). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts proposed for use as listed in Table 8.12-3R of the AFC and determined the need and appropriateness of their use;
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment;
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs;
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews; and
- Step 5: Staff then analyzed the theoretical impacts on the public worst-case spill of hazardous materials even with the mitigation measures proposed by the applicant. If the mitigation methods proposed by the applicant were found to be sufficient, no further mitigation would be required. If the proposed mitigation proposed by the applicant were found to be insufficient to reduce the potential for adverse impacts to an insignificant level, staff would then propose additional prevention and response controls until the potential for causing harm to the public was reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

PROJECT IMPACTS

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form, in smaller quantities, have low mobility, or have low levels of toxicity.

In addressing the potential for impacts during the construction phase of the project, the only hazardous materials proposed for use include gasoline, fuel oil, hydraulic fluid, lubricants, solvents, cleaners, sealants, welding flux, paint, and paint thinner. Any impact of spills or other releases of these materials would be limited to the site due to the small quantities involved and thus no further analysis of construction phase activities appears warranted. These chemicals would be present in very small quantities – and some are solids, thus posing an insignificant risk of off-site impacts. Therefore, these hazardous materials were eliminated from further consideration.

Continuing with the assessment for the operational phase, after removing from consideration those chemicals that fit into Steps 1 and 2, staff continued with Steps 3, 4 and 5 to review the remaining hazardous materials: sodium hypochlorite, natural gas, sodium hydroxide, and aqueous ammonia.

Large Quantity Hazardous Materials

Hydrochloric acid

Hydrochloric acid, which is used in large quantities once every four years for the cleaning of the Heat Recovery Steam Generators (HRSG), does not pose a significant risk of off-site impacts because of the infrequent use and the safety measures taken by the HRSG cleaning company, including the use of temporary berms.

Sodium Hypochlorite

According to the Table 8.5-3 (Roseville 2003a), 2000 gallons of sodium hypochlorite would be stored at the site. Sodium hypochlorite has a low potential to affect the off-site public because its vapor pressure is low and it is in an aqueous solution. In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form under pressure. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative chlorine gas. The amount of sodium hypochlorite that would be stored on the site is below the Reportable Quantity as defined in the Cal-ARP regulations. Based upon staff's knowledge about the use of this material and the modeling of accidental releases, an aqueous solution of sodium hypochlorite poses an insignificant risk to the off-site public. However, the chances for accidental spills during transfer from delivery vehicles to the storage tanks should still be reduced as much as possible. Thus, measures to prevent transfer spills are extremely important and would be required as a standard condition in a Safety Management Plan for delivery of sodium hypochlorite (see Condition of Certification **HAZ-3**).

Sodium Hydroxide

Sodium hydroxide would be stored on site but would not pose a risk of off-site impacts because it has relatively low vapor pressure and thus spills would be confined to the site. Therefore, no further analysis is needed.

Natural Gas

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane, and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas. While natural gas would be used in significant quantities, it would not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices.

In particular, gas explosions can occur in the HRSG and during start-up. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed

valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures would 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, thus 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 significantly reduce the potential for equipment failure due to improper maintenance or human error.

Since the proposed facility would require the installation of a new gas pipeline off-site, impacts from this pipeline were evaluated.

The design of the natural gas pipeline is governed by laws and regulations discussed here. These LORS require use of high quality arc welding techniques by certified welders and inspection of welds. Many failures of older natural gas lines have been associated with poor quality gas welds. Many failures in older pipelines have also resulted from corrosion. Current codes address this failure mode by requiring use of corrosion resistant coatings and cathodic corrosion protection. Another major cause of pipeline failure is damage resulting from excavation activities near pipelines. Current codes address this mode of failure by requiring clear marking of the pipeline route. An additional mode of failure, particularly relevant to the project area, is damage caused by earthquake. Existing codes also address seismic hazard in design criteria (see discussion below). Evaluation of pipeline performance in recent earthquakes indicates that pipelines designed to modern codes perform well in seismic events while older lines frequently fail. Staff believes that existing regulatory requirements are sufficient to reduce the risk of accidental release from the pipeline to insignificant levels.

Failures of gas pipelines, according to data from the U.S. Department of Transportation (the National Transportation Safety Board) from the period 1984 - 1991, occur as a result of pipeline corrosion, pipeline construction or materials defects, rupture by heavy equipment excavating in the area such as bulldozers and backhoes, weather effects, and earthquakes. Given the gas line failures which occurred in the Marina District of San Francisco during the 1989 Loma Prieta earthquake, the January 1994 Northridge earthquake in Southern California, and the January 1995 gas pipeline failures in Kobe, Japan, as well as the January 19, 1995 gas explosion in San Francisco, the safety of the gas pipeline is of paramount importance. However, it must be noted that those pipelines, which failed, were older and not manufactured nor installed to modern code requirements. The February 2001 Nisqually Earthquake near Olympia Washington caused no damage to natural gas mains and there was only one reported gas line leak due to a separation of a service line going into a mobile home park.

The natural gas pipeline proposed for the REP facility would be designed, constructed, and owned by Pacific Gas & Electric Company (PG&E). The pipeline would be designed, constructed, and operated in accordance with Title 49, Code of Federal Regulations, part 192 and the California Public Utility Commission's General Order 112-E. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in proximity to populated areas. If loss of containment occurs as a result of pipe, valve, or other mechanical failure or external forces, significant quantities of compressed natural gas could be released rapidly. Such a release can result in a significant fire and/or explosion hazard, which could cause loss of life and/or significant

property damage in the vicinity of the pipeline route. However, the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to DOT statistics, the frequency of reportable incidents is about 0.25 for all pipeline incidents per 1,000 miles per year or 2.5×10^{-4} incidents per mile per year. DOT has also evaluated and categorized the major causes of pipeline failure. To summarize, the four major causes of accidental releases from natural gas pipelines are: Outside Forces-43 percent, Corrosion-18 percent, Construction/Material Defects-13 percent, and Other-26 percent. Outside forces are the primary causes of incidents. Damage from outside forces includes damage caused by use of heavy mechanical equipment near pipelines (e.g., bulldozers and backhoes used in excavation activities), weather effects, vandalism, and earthquake-caused rupture as seen in the Marina District of San Francisco during the 1989 Loma Prieta Quake and in Kobe, Japan in January 1995. The fourth category, "Other" includes equipment component failure, compressor station failures, operator errors, and sabotage. The average annual service incident frequency for natural gas transmission systems varies with age, the diameter of the pipeline, and the amount of corrosion.

Older pipelines have a significantly higher frequency of incidents. This results from the lack of corrosion protection and use of less corrosion resistant materials compared to modern pipelines, limited use of modern inspection techniques, and higher frequency of incidents involving outside forces. The increased incident rate due to outside forces is the result of the use of a larger number of smaller diameter pipelines in older systems, which are generally more easily damaged and the uncertainty regarding the locations of older pipelines.

In the United States, extensive federal and state pipeline codes and safety enforcement minimize the risk of severe accidents related to natural gas pipelines. As a result of changes made to Title 49, Code of Federal Regulations, part 192, that became effective during January 2004, the DOT Office of Pipeline Safety now requires operators to develop integrity management programs for gas transmission pipelines, and to perform ongoing assessments of pipeline integrity. These additional requirements decrease the probability of leak or rupture of the pipeline, and reduce what staff already considered an insignificant risk.

Staff believes the worst-case scenario for off-site natural gas hazard is a large rupture of the pipeline caused by improper use of heavy equipment near the pipeline. This worst-case scenario would not result in significant asphyxiation hazard since natural gas disperses to the atmosphere rapidly when released. The worst-case scenario is primarily a safety hazard to construction workers. The project owner would mark the pipeline in conformance with State and federal regulations to lower the probability of the above scenario.

The following safety features would be incorporated into the design and operation of the natural gas pipeline (as required by current federal and state codes): (1) while the pipeline will be designed, constructed, and tested to carry natural gas at a certain pressure, the working pressure will be less than the design pressure; (2) butt welds will be X-rayed and the pipeline will be tested with water prior to the introduction of natural

gas into the line; (3) the pipeline will be surveyed for leakage annually (4) the pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and (5) valves at the meter will be installed to isolate the line if a leak occurs.

Aqueous Ammonia

Aqueous ammonia would be used at the REP in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in hazardous down-wind concentrations of ammonia gas. One 10,000-gallon tank would be used to store a maximum amount of 9,000 gallons of 28 percent aqueous ammonia solution (Roseville 2003a).

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

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four "bench mark" exposure levels of ammonia gas occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 150 ppm (recently changed from the 200 ppm value), which is also the RMP level 1 criterion used by U.S. EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm. (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis.) If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff presumes that the potential release poses a risk of significant impact. However, staff also assesses 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.

Data Response 40 (CH2MHILL 2004a) provided the results of modeling for a worst-case accidental release of aqueous ammonia. The analysis assumed winds of 1.5 meters per second and atmospheric stability category F would exist at the time of the accidental release. An air temperature of 111º F was assumed. The SLAB (Ermak) air dispersion model was used to estimate airborne concentrations of ammonia. These analyses included many conservative assumptions, and were designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The worst-case release is associated with a failure of the ammonia storage tank releasing all of its content into the secondary containment area, and the alternative scenario is a failure of a supply truck loading hose spilling aqueous ammonia onto the truck unloading pad with flow to the capture sump.

The results indicated that concentrations exceeding 75 ppm in the worst-case scenario would be present at 109 feet, which is entirely limited to the project site. There would be no off-site areas impacted by the 75-ppm concentration. Because the alternative scenario involves a much smaller volume of spill and assumes meteorological conditions that would be increase dispersion of the vapor cloud, the maximum distance for that scenario would also be entirely within the site's fence line.

There are no sensitive receptors (schools, hospitals, day care centers, etc.) in a two-mile radius of the site. If and when the West Roseville Specific Plan (WRSP) is completed, there are planned to be built four schools that range in distance 0.4 to 0.9 miles from REP. A high density residential area is planned for approximately 0.3 miles west of REP. The WSRP prohibits housing to be built within 1000 feet of the water treatment plant which is adjacent to REP's proposed site.

As there is an insignificant chance of a spill causing ammonia concentrations to exceed the 75 ppm de minimus level beyond the fence line of REP, staff believes that even with the likely build-out of the WRSP, there will still be no significant impact to the offsite public.

Staff reviewed the applicant's modeling calculations and found that due to the engineering controls proposed to be implemented by the applicant for the storage and transfer of aqueous ammonia, any accidental release of aqueous ammonia used for the project would not cause a significant impact.

Seismic Issues

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

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage - including seam leakage - were older tanks while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards, which should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia,

Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on **Geologic Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of CCR Title 24 and the 2000 Uniform Building Code for Seismic Zone 3. Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks, staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, sodium hypochlorite, and others would be transported to the facility via tanker truck or shipping trucks. While many types of hazardous materials would be transported to the site, staff has found that transport of aqueous ammonia poses the predominance of risk associated with such transport. If the risks of transporting this hazardous material is insignificant, all other transportation risks would be insignificant as well.

Although an accidental release of aqueous ammonia during transportation to an Energy Commission-certified gas power plant is extremely unlikely, it is possible for aqueous ammonia to be released during a transportation accident. The extent of impact in the event of such a release would depend on the location and on the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent on three factors:

1. the skill of the tanker truck driver;
2. the type of vehicle used for transport; and
3. accident rate for hazardous materials transport trucks.

Staff routinely focuses on the surface streets within the project area after the delivery vehicle leaves the main highway. Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on main California Highways to ensure safe handling in general transportation (see The Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, The U.S. Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence. (See AFC section 8.12.2. for additional information on regulations governing the transportation of hazardous materials.)

To address the issue of tank truck safety, aqueous ammonia would be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with design capacity of 6,000 gallons. These vehicles are designed to DOT Code MC-307. These are high integrity vehicles designed for hauling of 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 would be made in a tanker which meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates

in the United States and California. Staff relied on several references to determine the approach to preparing a hazardous materials transportation accident risk analysis (Rhyne, Davies, Harwood 1990, Harwood 1993, Vilchez, Pet-Armacost) supplemented with the following national data bases:

- National Response Center Data Base on chemical spills
- Chemical Incident Reports Center, U.S. Chemical Safety Board data base
- National Transportation Safety Board data base

Staff used this data and that from the Davies and Lee (1992) article, which references the 1990 Harwood study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The maximum usage of aqueous ammonia each year of operation of the proposed REP would require about 24 - 36 tanker truck deliveries of aqueous ammonia per year (maximum of 2-3 trucks per month; Roseville 2003a). Each delivery truck would travel about 5 miles between State Route (SR) 65 and the facility per delivery along the designated transportation route (Blue Oaks Boulevard, then Fiddyment Road, then Phillip Road) that will initially be used. The result is a maximum of 360 miles of delivery truck travel in the project area per year. Previous assessments by staff have found that the risk over this distance is negligible. Longer term, a portion of Phillip Road is planned to be discontinued. Then, the likely hazmat delivery route would be along Blue Oaks Boulevard, to Phillip Road. The long-term transportation route to be used for REP would consist of relatively new roads, some not yet built (ROSEVILLE 2003a). Built using the most recent DOT road safety standards, staff expects that this route will present safety risks lower than the already insignificant risks found in studies based on older accident data. Because the hazmat route is likely to change over time due to road changes resulting from the planned build-out of the area surrounding REP, staff proposes Condition of Certification, **HAZ-6,** addressing transportation of aqueous ammonia and other hazardous materials, to ensure against significant health and safety impacts to the public.

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

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

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Based on this, staff concludes that the risk associated with transportation of other

hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Site Security

This facility proposes to use hazardous materials which have been identified by the U.S. EPA as materials where special site security measures should be developed and implemented to ensure that unauthorized access is prevented. The EPA published a Chemical Accident Prevention Alert regarding Site Security (EPA 2000a) and the U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002). In order to ensure that this facility or a shipment of hazardous material is not the target of unauthorized access, staff's proposed General Condition of Certification on Construction and Operations Security Plan **COM-8** in the **General Conditions** portion of this document would require the preparation of a Vulnerability Assessment and the implementation of Site Security measures consistent with the above-referenced documents.

The level of security should be dependent upon the threat imposed and the consequences of a successful breach of the facility boundaries. In order to determine the level of security, staff will provide guidance in the form of a decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002). Basic site security measures should be required at all locations in order to protect the infrastructure and electrical power generation within the state. These measures will include perimeter fencing, guards, alarms, law enforcement contact in the event of security breach, and fire detection systems. Other locations will have additional security measures dependant upon the results of the vulnerability assessment.

The level of security to be implemented at each power plant is a function of the likelihood of an adversary attack, the likelihood of adversary success in causing a catastrophic event, and the severity of consequences of that event. It is only after conducting a vulnerability assessment that the level of security required will be known. The vulnerability assessment will be based, in part, on the use and storage of certain quantities of acutely hazardous materials as described by the California Accidental Release Prevention Program (Cal-ARP - Health and Safety Code, section 25531). This will allow staff to use the results of the off-site consequence analysis prepared as part of the Risk Management Plan (RMP) to determine the severity of consequences of a catastrophic event.

Site personnel background checks will be required for this site and will most likely be limited to ascertaining that the employee's claims of identity and employment history are accurate. All site personnel background checks would be consistent with state and federal law regarding security and privacy.

Site access for vendors should be strictly controlled. Consistent with recent state and current federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only drivers properly licensed and trained. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous

materials conduct background security checks on any employee involved in the transportation and delivery of hazardous materials to the power plant. This requirement will be similar to those conditions of certification which require a project owner to ensure that hazardous materials deliveries are made only in approved vehicles and only via an approved delivery route. All hazardous materials vendor delivery personnel background checks would be consistent with state and federal law regarding security and privacy.

CUMULATIVE IMPACTS

Staff reviewed the potential for the operation of the REP combined with any existing or planned industrial facilities to result in cumulative impacts on the population within the area. Projects that could potentially contribute to cumulative impacts are those located or which will be located in the same geographic area of influence defined as within a 1-mile radius of the proposed power plant. Currently, the Pleasant Grove Waste Water Treatment Plant (PGWWTP) is within one mile of REP's proposed site. Additionally, the WRSP build-out plan contains areas zoned for industrial use that will also be within one mile of REP.

As REP does not present a significant potential for impacts beyond its boundaries, it does not present significant potential to contribute to cumulative impacts with other sources.

Staff finds that the proposed REP facility with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. It is also extremely unlikely that an accidental release that has very low probability of occurrence (about one in a million per year) would independently occur simultaneously at the REP and another facility at the same time.

APPLICANT'S PROPOSED MITIGATION

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

ENGINEERING CONTROLS

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

- construction of curbs, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;

- construction of an underground spill containment vault with a wide 24-inch diameter drain from the aqueous ammonia secondary containment basin;
- a sloped containment pad for the aqueous ammonia tanker truck delivery area that will drain through into the same subsurface covered vault placed beneath the storage tank; and
- process protective systems including continuous tank level monitors, alarms, automatic shut-off valves, and fire protection systems.

ADMINISTRATIVE CONTROLS

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

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

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

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

The facility's Safety Management Program would include regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals. REP would also prepare a Hazardous Materials Business Plan and a Risk Management Plan (RMP).

In order to address the issue of spill response, REP would prepare and implement an Emergency Response Plan which includes information on: hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established which include evacuation; spill cleanup, hazard prevention, and emergency response.

STAFF'S PROPOSED MITIGATION

Staff proposes eight 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 those listed in the AFC unless there is prior approval by the County and the Energy Commission Compliance Project Manager (CPM). **HAZ-2** requires that a RMP be prepared and submitted prior to the delivery of aqueous ammonia. The worst-case accidental release scenario evaluated in the AFC assumed that accidental spills of aqueous ammonia would occur from the storage tank into the catchment system. Staff believes that the most likely event resulting in a spill would be during transfer from the delivery tanker to the storage tank. Staff therefore proposes a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of aqueous ammonia (as well as aqueous hypochlorite solution). The development of a Safety Management Plan addressing delivery of ammonia would further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required Risk Management Plan (RMP). **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications, **HAZ-5** addresses the transportation of aqueous ammonia, and **HAZ-6 and -7** address the safety of the gas pipeline.

FACILITY CLOSURE

The requirements for the handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, Roseville Electric is responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that Roseville Electric abandons the facility in a manner, which poses a risk to surrounding populations, staff would coordinate with the California Office of Emergency Services, City of Roseville Fire Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state, or local agencies until the cost can be recovered from the responsible parties.

RESPONSE TO COMMENTS

Roseville Electric (July 16, 2004): RE pointed out that US-EPA does not approve RMP's. Staff agrees that the phrase "EPA-approved" should be removed from Proposed Condition of Certification **HAZ-2**, and the condition has been so modified (G&B 2004b). RE additionally requests that the **HAZ-2** deadline for submission of the final Business Plan and the final RMP to the CPM be changed from 60 days prior to receiving any hazardous material on site, to 30 days. Staff agrees that this is appropriate and the condition has been so modified (G&B 2004b).

Roseville Electric (July 16, 2004): RE requested that staff's proposed Condition of Certification **HAZ-3**, be modified so that a separate delivery plan for sodium hypochlorite is not required. Staff agrees that this is appropriate, and the condition has been so modified (G&B 2004b).

Roseville Electric (July 16, 2004): RE requested that staff's proposed Condition of Certification **HAZ-4**, be modified so that the required volume of secondary containment for aqueous ammonia storage be changed from 125% to 100% of the storage volume (plus the volume associated with 24 hours of rain assuming the 25-year storm. Staff agrees that this is appropriate, and the condition has been so modified (G&B 2004b).

Roseville Electric (July 16, 2004): RE requested that staff's proposed Conditions of Certification **HAZ-6 and Haz-7**, be deleted because RE will neither own nor operate the pipeline. The pipeline will be built, owned, and operated by Pacific Gas and Electric (PG&E). As a consequence, the applicant would have no mechanism to comply with these conditions (G&B 2004b).

Staff has previously reviewed PG&E's policies and procedures for maintenance and operation of gas pipelines. These procedures include the requirement to inspect the pipelines after significant seismic events. Staff found these procedures to be rigorous and to be in keeping with the intent and need to protect public health and safety. Staff therefore agrees that it is appropriate to remove the former Conditions of Certification, **Haz-6 and Haz-7**, found in the preliminary staff analysis.

Roseville Joint Union High School District (October, 18, 2004): Staff examined whether there was significant potential for hazardous materials management or transportation incidents to impact occupants of a proposed high school to be built near the REP site. As the proposed school site is not within a 0.25-mile radius of either the proposed REP site or the hazmat transportation route, staff found that there is insignificant potential for impact (see page 4.4.11).

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use would pose little potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS). As previously discussed in this section under the topics of storage, transportation, and cumulative impacts of hazardous materials use, the construction and operation of the REP in conjunction with the ultimate build-out of the WRSP will not contribute significant impacts to the public, nor change any of the conclusions herein. In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by U.S. EPA, City of Roseville Fire Department, and Energy Commission staff. In addition, staff's proposed conditions of certification require City of Roseville Fire Department's review, and staff's review and approval of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

Staff recommends the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and

operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material not listed in Appendix B (AFC Table 8.5-3), below, or in greater quantities than those identified by chemical name in Appendix B, below, unless approved in advance by the City of Roseville Fire Department and 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) to the Certified Unified Program Authority - CUPA (City of Roseville Fire Department) and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). The project owner shall reflect all recommendations of the City of Roseville Fire Department and the CPM in the final documents. Copies of the final Business Plan and RMP, reflecting all comments, shall be provided to the CPM.

Verification: At least 30 days prior to receiving any hazardous material on the site, the project owner shall provide a copy of a final Business Plan to the CPM. At least 30 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP, to the City of Roseville Fire Department and the CPM.

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

Verification: At least 60 days prior to the delivery of aqueous ammonia to the facility, the project owner shall provide the plan to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 100% of the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least 60 days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

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

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

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

Verification: At least 60 days prior to any hazardous materials on site, the project owner shall submit to the CPM for review and approval a copy of the letter to be mailed to the vendors. The letter shall state the required transportation route limitation.

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APPENDIX A

HAZARDOUS MATERIAL MANAGEMENT

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

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

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm

STPEL. Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

HAZARDOUS MATERIAL MANAGEMENT
APPENDIX A TABLE 1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants

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ABBREVIATIONS FOR APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists

AIHA, American Industrial Hygienists Association

EEGL, Emergency Exposure Guidance Level

EPA, Environmental Protection Agency

ERPG, Emergency Response Planning Guidelines

IDLH, Immediately Dangerous to Life and Health Level

NIOSH, National Institute of Occupational Safety and Health

NRC, National Research Council

STEL, Short Term Exposure Limit

STPEL, Short Term Public Emergency Limit

TLV, Threshold Limit Value

WHO, World Health Organization

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Acutely Hazardous Materials:							
NALCO 356	Cyclohexylamine (20 to 40%) Morpholine (5 to 10%)	108-91-8 110-91-8	400gal.	Corrosive	10,000 lb.	10,000 lb.	No
Hazardous Materials:							
Aqueous ammonia (28% solution)	Ammonium hydroxide	1336-21-6	10,000-gal.	Corrosive Volatile	1000 lb.		No
Sulfuric acid	Sulfuric acid	7664-93-9	2,000 gal.	Corrosive	1,000 lb.	1,000 lb.	No
Bleach	Sodium hypochlorite	7681-52-9	2,000 gal.	Corrosive	100 lb.		No
NALCO 7342	Sodium nromide	7647-15-6	800 gal.	Corrosive	(4)		No
NALCO TRASAR 23263		None	400 gal.	Non-hazardous	(4)		No
NALCO 7208	Trisodium phosphate	7601-54-9	400 gal.	Corrosive, toxic	5,000 lb.		No
NALCO STABREX ST70	Sodium hydroxide (1 to 5%) Sodium hyprobromite (10 to 50%)	1310-73-2 13824-96-9	2000 gal.	Corrosive	1000 lb. (4)		No No
NALCO 7330	Isothioazoline	261-72-554	55 gal.	Corrosive	(4)		No
NALCO 8305+	Sodium tolyltriazole	64665-57-2	800 gal.	Toxic	(4)		No
Hydrochloric acid	Hydrochloric acid	7647-01-0	4,500 lbs.	Corrosive	5,000 lb.		No
Citric acid	Hydroxy-propionic-tricarboxylic Acid	77-92-9	50 lbs.	Corrosive	(4)		No
Hydroxyacetic acid	Gyrolic acid	79-14-1	600 lbs.	Corrosive	(4)		No
Formic acid	Methanoic acid	64-18-6	350 lbs.	Corrosive	5,000 lb.		No

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
NALCO ELIMIN-OX	Carbohydrazide	497-18-7	400 gal.	Non-Hazardous			No
Anti-foam (e.g., NALCO 71 D5 ANTIFOAM)	Hydrotreated light distillate (10-20%) n-Decanol (1 to 5%) n-Octanol (5 to 10%)	6742-47-8 112-30-1 118-87-5	400 gal.	Combustible	(4)		No
Calcium sulfate	Calcium sulfate	10101-41-4	4,000 lbs.	Toxic	(4)		No
Chelating agents	Ethylenediaminetetra-acetic acid (EDTA)	60-00-4	55 gal.	Toxic	5,000 lbs.		No
Sodium sulfate	Sodium sulfate	7757-82-6	4,000 lb.	Toxic	(4)		No
Lubrication oil	Oil	None	12,000 gal. (all turbines)	Combustible	42 gal.[5]		Yes
Mineral insulating oil	Oil	None	55,000 gal.	Combustible	42 gal.[5]		Yes
Sulfur hexafluoride	Sulfur hexafluoride	2551-62-4	200 lbs.	Inert	(4)		No
Diesel Fuel	Oil	None	400 gal.	Combustible	42 gal.[5]		Yes
Detergents	Various	None	100 gal.	Toxic	(4)		--
Lab reagents (liquid)	Various	None	10 gal.	Toxic	(4)		--
Lab reagents (solid)	Various	None	50 lbs.	Toxic	(4)		--
Ammonium bifluoride	Ammonium bifluoride	1341-19-7	100 lbs.	Toxic, Corrosive	100		No
Sodium bisulfite	Sodium bisulfite	7631-90-5	55 gal.	Corrosive	5,000 lbs		No
Sodium carbonate	Sodium carbonate	497-19-8	250 lbs.	Corrosive	(4)		No

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Sodium nitrate	Sodium nitrate	**7631**-99-4	250 lbs.	Corrosive	(4)		No

1 Chemical Abstract Service.
2 Reportable Quantity per CERCLA. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
3 Threshold Planning Quantity. Default TPQ for hazardous materials is 10,000 lb.
4 No reporting requirement.
5 Must report if does or will reach California state waters, or if quantity released is a "harmful quantity."

Source: Roseville Energy Park AFC, Table 8.5.3

LAND USE

Testimony of David Flores

INTRODUCTION

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This section describes federal, state, regional, and local land use laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

FEDERAL

There are no Federal land use-related LORS that apply to this project.

STATE

California Department of Education

Education Code Section 17521 and the California Code of Regulations Title 5, sections 14001 through 14012, outline the powers and duties of the Department of Education (CDE) regarding future school site selection. The code section also provides distance requirements from hazardous pipelines and air emission sources that school districts are required to assess for school site selection. Although no schools are currently located within close proximity of the REP site, with the recent approval of the West Roseville Specific Plan by the City of Roseville, future school sites in the vicinity have been identified. Energy Commission staff will be assisting the CDE in providing specific data as needed to assure school site compliance with State law.

Subdivision Map Act (Pub. Resources Code, § 66410-66499.58)

The Subdivision Map Act provides procedures and requirements regulating land divisions (subdivisions) and the determining of parcel legality. Regulation and control of the design and improvement of subdivisions, by this Act, has been vested in the legislative bodies of local agencies. Each local agency by ordinance regulates and controls the initial design and improvement of common interest developments and subdivisions for which the Map Act requires a tentative and final map.

LOCAL

City of Roseville

City of Roseville Zoning Ordinance

The City of Roseville Zoning Ordinance (Title 19 of the Roseville Municipal Code) establishes land use (zone) districts in the incorporated areas of the City. In each specific land use district, the types of development, dimensions for buildings, and open spaces are regulated for the purpose of implementing the general plan of the city. The purposes of these regulations are protecting existing development, encouraging beneficial new development, and preventing overcrowding and congestion. **LAND USE Figure 1** shows the zoning districts in the area of the proposed project site.

City of Roseville General Plan

Under California State planning law, each incorporated City and County must adopt a comprehensive, long-term General Plan that governs the physical development of all lands under its jurisdiction. The general plan is a broadly scoped planning document and defines large-scale planned development patterns over a relatively long timeframe.

The General Plan consists of a statement of development policies and must include a diagram and text setting forth the objectives, principles, standards and proposals of the document. At a minimum, a General Plan has seven mandatory elements including Land Use; Circulation; Housing; Conservation; Open Space; Noise and Safety. The City of Roseville added a Public Facilities Element to their General Plan, which is discussed further in the **IMPACTS** section of this analysis.

The City of Roseville administers the State required general plan as a group of documents organized by geographic areas and subject matter and has included a Land Use element in its Plan (Government Code, § 65301). **LAND USE Figure 2** shows the general plan designations in the area of the proposed project site.

West Roseville Specific Plan

The City of Roseville adopted a resolution for approval of the West Roseville Specific Plan (WRSP) on February 4, 2004. The second reading was approved by the City Council on February 23, 2004. On July 14, 2004 the Placer County Local Agency Formation Commission (LAFCO) approved the West Roseville annexation request.

LAND USE Figure 3 shows land use designations under the WRSP. Land uses in the WRSP will include a mixed-use planned development, industrial, commercial, park/open space, school sites, and public/quasi-public uses. As also shown in **Figure 3**, land immediately west of the project site is zoned General Industrial; to the east of the REP site, land will be preserved as open space and/or developed as a regional park.

Placer County

Placer County General Plan

Placer County administers the State required general plan as a group of documents organized by geographic areas and subject matter. (Government Code, § 65301).

Similar to the City of Roseville's General Plan, the Placer County General Plan includes specific policies designed to preserve and enhance existing development and to provide for orderly and appropriate new development to meet the needs of the area for the next 20 years.

Land Use Element

The Land Use Element addresses the types and locations of land uses (e.g., residential, industrial, commercial, agriculture, infrastructure such as roads, wastewater treatment, and utility facilities) that the County Supervisors consider appropriate for the long-range outlook of the General Plan.

The General Plan designation for lands adjacent to the north of the REP site that are not within the Roseville city limit is Agriculture.

Placer County Zoning Ordinance

The Placer County Zoning Ordinance (Title 17 of the Placer County General Code) establishes land use (zone) districts in the unincorporated area. In each specific land use district, the types of development, dimensions for buildings, and open spaces are regulated for the purpose of implementing the general plan of the county. The purposes of these regulations are protecting existing development, encouraging beneficial new development, and preventing overcrowding and congestion. The areas north of the REP project site are within the Farm (F) district.

SETTING

SITE AND VICINITY DESCRIPTION

The proposed Roseville Energy Park (REP) is to be built on a 12-acre portion of an approximately 40-acre parcel situated approximately one mile west of the City of Roseville boundary. However, both the REP plant site and the Pleasant Grove Waste Water Treatment Plant (PGWWTP) have been annexed by the City, thus creating a non-contiguous island of City property surrounded by Placer County land. With the final approval of the West Roseville Specific Plan by LAFCO in late August, the non-contiguous status will no longer exist. The site is located north of Phillip Road. Access to the site will be from Phillip Road via a new access driveway. The site is located approximately 7 miles north of Interstate 80 and 5 miles northwest of State Highway 65.

The parcel is currently undeveloped and is currently being used as a construction staging and laydown area for the construction of the PGWWTP. The site was formerly used for rural residential purposes and grazing. With the site currently being used as a

construction staging area, buildings associated with one of the former residences are being used for storage of materials and construction management activities.

SURROUNDING LAND USES

Current

Current land uses surrounding the site include large parcel agriculture, open space and livestock grazing. Specific surrounding uses are described as follows:

- North: Approximately 1,200 feet to the north of the project site is a rural residence and barn. A dog kennel/residence is located 850 feet to the northwest.
- South: The Pleasant Grove Waste Water Treatment Plant is approximately 2,000 feet south of the REP site.
- East: Rural residence and additional out buildings.
- West: Rural residence and outbuilding located 4,100 feet to the northwest.

Other uses in the vicinity of the REP site include the Del Webb Roseville Sun City community, approximately 1.2 miles east, the Robert Cooley Middle School, located approximately 2.7 miles east of the project site, and St. Clare Catholic Church, located approximately 4 miles south of the project site.

Planned

As indicated earlier in this report, the West Roseville Specific Plan is proceeding through the final approvals (i.e., LAFCO annexation request and final boundary map review) stage, and the first phases of the housing developments are anticipated in early 2005. Proposed land uses within the specific plan include general industrial (located to the west of the PGWWTP); light industrial (west of and south of the PGWWTP); commercial, high-density, medium density and low-density residential; parks and recreation; open space; public/quasi-public areas and various proposed school locations (See **LAND USE –Figure 3** for proposed zoning under the WRSP).

IMPACTS

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

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- disrupt or divide the physical arrangement of an established community; or
- convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use.

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

CONFORMITY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Public Resources Code § 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the [Energy] commission determines that such a facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity. In making the determination, the commission shall consider the entire record of the proceeding, including, but not limited to the impacts of the facility on the environment, consumer benefits, and electric system reliability." In no event shall the commission make any finding in conflict with applicable federal law or regulation. When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (§ 25523(d)(1)). The laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the REP is consistent or at variance with each requirement or standard.

PROJECT SITE

State

Subdivision Map Act, 1972

The REP site is comprised of three individual and separate legal parcels which encompasses 40 acres. The REP facilities would occupy approximately 12 acres of the property. The area within the power plant and switchyard fence lines will encompass 9.1 acres. Condition **LAND-3** would require that the project owner will obtain the necessary approvals from the City of Roseville to complete any lot merger or lot line adjustments necessary to ensure the proposed project, including associated facilities, will be located on a single legal lot which is in compliance with Section 18.10.010 of the Roseville Subdivision Ordinance.

California Department of Education

Although no schools are currently located within close proximity of the REP site, with the recent approval of the West Roseville Specific Plan by the City of Roseville and LAFCO, future school sites in the vicinity have been identified. The REP proposed several alternate gas pipeline routes in the AFC, but has since elected to withdraw from consideration the pipeline routes that were within 1,500 feet of any planned school facilities as identified in the West Roseville Specific Plan. With this reconsideration by REP, the preferred gas line route will not trigger any additional gas line risk analysis by the California Department of Education. There are no school sites planned within a quarter-mile (1,320 feet) of the REP which relate to CDE's requirement that school districts must make a public health finding if a school site would be within a quarter-mile of a potentially hazardous air-emissions source.

City of Roseville General Plan/Land Use LORS and Policies

Public Facilities Element

The General Plan was adopted by Roseville's City Council in 1992 and a technical update was adopted in 2003. The General Plan reflects the values and contains the goals of the community regarding development. The City chose to incorporate a Public Facilities Element as an optional element into its General Plan to recognize the importance of establishing goals and policies related to public facilities. The following General Plan/Public Facilities goals and policies applicable to the REP project are listed below:

- **Goal 1:** Maintain a municipal electric utility that provides an efficient, economical, and reliable electric system.
- **Goal 2:** Provide electric services to all existing and future Roseville development **through** the City's Electric Utility. The provision of services by another provider may be considered where it is determined that such service is beneficial to the City and its utility customers or the provision of City services is not feasible.
- **Goal 3:** Maintain adequate resource reserves consistent with the industry standards, sound utility planning, and applicable conservation measures.
- **Goal 4: Aggressively** pursue cost-effective and environmentally safe alternate sources of energy and energy conservation measures.
- **Policies 1:** Secure new electric resources and transmission as necessary to meet projected demand levels.
- **Policies 2:** Provide improvements to the sub-transmission and distribution system, consistent with facility planning studies, to insure a reliable source of electricity is maintained.
- **Policies 3: Develop** siting and land use compatibility standard for energy facilities.
- **Policies 4:** Extend existing resource contracts if found to be in the best interest of the City.

To ensure that the REP conforms to the City of Roseville Zoning Code, staff is recommending that the Commission require the following Conditions of Certification:

- **LAND-1** would require that the applicant submit evidence of the City's review regarding compliance setback requirements, building elevations, temporary and permanent signs, parking requirements, and design and performance standards for the P/QP Zoning District;
- **LAND-2** would require that the applicant submit to the City of Roseville descriptions of the final laydown/staging areas for the City's review and comment; and
- **LAND-3** would require that the applicant shall obtain the necessary approval(s) from the City of Roseville for merger or lot line adjustment(s) necessary to ensure that the proposed project will be located on a single legal lot and owned by one entity.

West Roseville Specific Plan

The West Roseville Specific Plan (Plan) does not specifically address the REP project as the Plan examines the potential project specific impacts of proposed developments within a 3,162 acre portion of land to be annexed into the City of Roseville's jurisdiction. The Plan contains guidance for areas to the west, east, and south of the REP project site and the Pleasant Grove Waste Water Treatment Plant. In order to provide sufficient buffers of the REP project from proposed residential developments, the Plan proposes industrial parks, Public/Quasi Public developments, and regional park components to assure public sensitivity of the REP and PGWWTP projects.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

Project Site

The project would be constructed on a 12-acre portion of a 40-acre Public / Quasi-Public designated parcel owned by the applicant.

Of the various zoning districts in the City's Zoning Ordinance, the Public/Quasi-Public (P/QP) zoning district in which the project site is located is the most appropriate zoning district for a power plant, which is intended to provide for general power production and passive power production facilities. Power plants are specifically listed as a compatible use in the "P/QP" District subject to a conditional permit. Since the City is the applicant, the City would not generally issue itself a conditional use permit, but would proceed through a process that mirrors the conditional use permit process. The City Council would act as the approval body, rather than the Planning Commission, and coordinate the referral agencies with the City to discuss potential conditions of approval. The City would then forward their proposed conditions to the Energy Commission which may incorporate Roseville's items as conditions of certification into the Commission's REP licensing process. The project complies with all of the applicable development standards (lot and yard requirements) set forth in the Zoning Ordinance for the "P/QP" District. The City of Roseville Planning Department reviewed the Preliminary Staff Assessment (PSA) to determine if additional conditions of certification were needed to bring the project into compliance with its local LORS. The City of Roseville staff identified no additional condition requirements.

The construction lay down area for REP would be immediately north of the power plant's structural footprint within the boundaries of the project site and, therefore, would not conflict with existing or planned land uses. Temporary, construction-related impacts, such as increased noise and dust, may affect adjacent land uses. With mitigation, these construction impacts are not expected to be significant. Please see the **AIR QUALITY** and **NOISE** sections of the FSA for discussions of impacts and mitigation. Staff has found that operation of the REP would not cause significant, unmitigated adverse noise, dust, public health hazard or nuisance, or traffic impacts on nearby land uses.

Existing land uses in the vicinity of the site consist of a waste water treatment plan, rural residential uses, a dog kennel, and various agriculturally related operations. The REP project's construction and operation phase would not preclude residents and other users

of the recreational facilities located in the City of Roseville or within Placer County from pursuing community activities.

Staff believes that the project's consistency with: 1) the City's land use designation and zoning for the site; and 2) the current development pattern for the area established by the City of Roseville is consistent with the General Plan and zoning ordinance, and that the REP is an allowed and compatible use for the area. The proposed REP development will be compatible with the current surrounding agricultural activities. Staff believes that the existing waste water treatment facility in the vicinity is compatible with surrounding uses, and the REP will be a similar industrial use.

Consistency and Compatibility with Planned Land Uses in the West Roseville Specific Plan

As provided in the West Roseville Specific Plan, a significant amount of development characterized as primary mixed use with residential, commercial, industrial, and light industrial development will occur within close proximity of the REP project.

From the land use planning perspective, staff has concerns with residential developments, such as an apartment complex, being located very close to an industrial sector. **LAND USE Figure 3** indicates that the West Roseville industrial sector would include the waste water treatment plant, the REP, and currently unknown industrial uses between the REP and a high density residential zone. Staff's measurements indicate that the WRSP high density residential zone would be approximately 1,000 feet from the REP, 900 feet from the waste water treatment plant, and approximately 60 feet from the WRSP industrially designated area. Staff would prefer to see a non-industrial buffer such as regional open space extended to the area west of the REP similar to that planned to the east. Such a buffer would be in addition to that provided by the REP's proposed landscape/screening proposal.

Staff contacted various local agencies such as the Sacramento Area Council of Governments and Sacramento County Planning Department to determine if separation criteria with distances between urban land uses such as residential development and industrial activities had been established. In all instances, the response was that no distance criteria had been established, but factors such as noise levels, lighting issues, and the type of industrial use can be a factor in determining the width of a buffer. In discussions with the California Department of Education, distance limits have been addressed for purposes of health and safety requirements. An example taken from their School Site Selection and Approval Guide addresses any existing or proposed facility within a quarter mile of a proposed school site that might reasonably be anticipated to emit hazardous air emissions. If a proposed school site is located within that distance, the local education agency must make findings that the facility does not constitute a public health risk.

With the industrial and high density developments being planned for the third phase of development within the WRSP, staff believes that there is some time for the developers of the WRSP, the applicant, and the City to consider provision of additional open space areas to the west of this planned development.

Conversion of Farmland

The 40-acre parcel containing the site does not have a land conservation contract. Also, the property is not within a Williamson Act preserve or a Farmland Security Zone. The linear facilities do not cross Williamson Act preserve lands or a Farmland Security Zone.

The proposed plant site is located within the Roseville City Limits. Although the site and the surrounding area are not currently urbanized, the project site has not been used as a farming headquarters or the surrounding area for cattle grazing for over 5 years. There are no significant agricultural uses in the vicinity of the project site or the natural gas pipeline route; therefore, there will be no impact on agriculture.

Linear Facilities

Disruption or Division of an Established Community

The natural gas line alignment would temporarily affect land currently being used in agricultural production (cattle grazing). The topsoil in the areas to be disturbed would be removed during the construction period and temporarily converted to non-agricultural use by this project. Soil surface would be returned to the original grades and agricultural use upon completion of construction activities. Therefore, no existing farmlands would be permanently converted to non-agricultural use for the REP's natural gas pipeline facilities. The impacts would be less than significant.

As discussed earlier in this report, the proposed natural gas pipeline route would be installed within dedicated right-of-ways along local roads. They would not affect adjacent residential activities.

CUMULATIVE IMPACTS

The proposed project is consistent with the City of Roseville's (City) long-range land use policies for this industrially-designated area as expressed in the City's General Plan/West Roseville Specific Plan. Conformance with the General Plan/West Roseville Specific Plan is the primary consideration in determining a project's potential to contribute to adverse cumulative land use impacts. Therefore, projects that are consistent with the City's long-range land use policies are not viewed as adverse from a cumulative impact perspective. The West Roseville Specific Plan (WRSP) sets forth the City's long-range vision for the physical development of this incorporated area, and other plans for infrastructure and public services are based on this long-range vision.

The WRSP envisions both long-term continuation of residential, industrial and commercial development in the site vicinity. LAFCO formally approved the annexation of 3,162 acres of land into the City of Roseville's jurisdiction which encompasses the West Roseville proposal in August 2004.

Other projects proposed in the vicinity of the REP project include three residential subdivisions in Placer County. Whisper Creek Unit No.1 consists of 104 lots, Whisper Creek Unit No. 2 consists of 80 lots, and the PFE Residential Subdivision consists of 91 lots. All three subdivisions are located in the area of PFE Road and Walegra Road

which is approximately four miles west of the REP project site, and are currently proceeding through the Draft Environmental Impact Report process. As to timing of these projects with the REP project, conceivably the REP project would be underway, before construction on any one of the residential subdivisions would occur.

The REP project is consistent with the City's long-range planning policies for industrial development in this area; therefore, cumulative land use impacts are not considered significant.

The proposed project is not expected to make a significant contribution to regional impacts related to new development and growth. The REP is planned to serve the City of Roseville's existing and anticipated electrical needs of its jurisdictional boundaries.

FACILITY CLOSURE

At some point in the future, the proposed facility would cease operation and close down. At that time, it would be necessary to ensure that closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The planned lifetime of the REP plant is estimated at thirty years. At least twelve months prior to the initiation of decommissioning, the applicant would prepare a Facility Closure Plan for Energy Commission review and approval. This review and approval process would be public and allow participation by interested parties and other regulatory agencies. At the time of closure, all applicable LORS would be identified and the closure plan would discuss conformance of decommissioning, restoration, and remediation activities with these LORS. All of these activities would fall under the authority of the Energy Commission.

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

RESPONSE TO COMMENTS

On July 16, 2004, the City of Roseville (City) provided comments and recommended language changes on the Preliminary Staff Assessment (PSA) in the area of staff's Conditions of Certification. Staff reviewed the recommendations by the City, and simplified the condition language in **LAND-1** to make it more conducive to the City's requirements in the Public/Quasi Public District.

On Condition of Certification **LAND-2**, the City requested a revision to the separate submittals requested under the Verification section. The additional words "*on the affected parcels*" were added to the end of the Verification paragraph. In addition, the City requested that under **LAND-3** that staff reference Roseville's Subdivision Ordinance, rather than cite the requirements under the ordinance. Staff has agreed to

these changes, which are reflected in the Conditions of Certification section of this report.

On August 18, 2004, the City of Roseville provided recommended conditions of approval to ensure that the REP would be consistent with the City's local LORS. The City requested that its conditions be included verbatim to reflect strict compliance with its land use ordinance. Staff reviewed the sixty-five Conditions of Approval provided by the City and determined that Condition 6 be incorporated into staff's Conditions of Certification **LAND-1**. The other recommended conditions were distributed to other sections of the Final Staff Assessment.

CONCLUSIONS

1. Staff believes that the project is consistent with the City's land use designation and zoning for the site.
2. The project would not disrupt or divide the physical arrangement of an established community. The community of Del Webb Roseville Sun City is approximately 1.2 miles away respectively from the subject property.
3. The project would not preclude or restrict existing or planned land uses, or the conduct of agricultural uses on neighboring properties.
4. With mitigation, operation of the project would not cause any significant noise, dust, public health, traffic, or visual impacts to nearby land uses, nor would the operation of the REP contribute substantially to any cumulative land use impacts.
5. With the lot merger of the three legal parcels as provided under Condition of Certification **LAND-3**, this will bring the parcels under conformance with the City of Roseville's Subdivision Ordinance, specifically Section 18.10.010.

If the project is approved, staff recommends that the Commission adopt the following proposed Conditions of Certification.

PROPOSED CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall prepare a site development plan that complies with the applicable design criteria and performance standards for the Public/Quasi Public District set forth in the City of Roseville Zoning Ordinance.

The internal site development shall follow the City's standards for Industrial property as identified within the City of Roseville Community Design Guidelines. The following provisions, where practicable, will be implemented in the site planning, lighting and architecture for the facility as required by the City of Roseville Community Design Guidelines, and referenced below:

a. The project, if phased shall be designed to function independently, without reliance on improvements included in subsequent phases.

b. Future phases shall have grass planted by hydroseeding at time of initial

grading. Construction sites associated with each phase shall be fenced sufficiently to protect the public safety and avoid conflicts between employees and the general public.

c. Provide sufficient room for the locations of underground utilities.

d. Project setbacks shall comply with the following:

- 25 feet along Phillip Road
- 50 feet along the future extension of Blue Oaks Boulevard.
- South and West property lines, the project setbacks shall comply with applicable building code setbacks.

e. Lighting sources should be thoughtfully located and shall have cut off lenses to minimize light spillage and glare on adjacent properties.

f. Pole mounted lighting should be spaced for maximum energy efficiency.

g. A landscape and architectural plan shall be submitted to the City of Roseville Planning Department for approval prior to construction.

Verification: At least 60 days prior to the start of construction, the project owner shall concurrently submit the site development plan to the CPM and the City of Roseville Planning Department. The material submitted to the CPM must include documentation that the City of Roseville Planning Department has been given the opportunity to review and comment on the plan and its compliance or conformance the above-referenced requirements.

LAND-2 The project owner shall provide descriptions of the final laydown/staging areas identified for project construction to the Director of the City of Roseville for review and comment, and the CPM for review and approval. The description shall include:

(a) Assessor's Parcel numbers;

(b) addresses;

(c) land use designations;

(d) zoning;

(e) site plan showing dimensions;

(f) owner's name and address (if leased); and,

(g) duration of lease (if leased); and, if a discretionary permit was required, copies of all discretionary and/or administrative permits necessary for site use as lay down/staging areas.

Verification: The project owner shall provide the specified documents at least 30 days prior to the start of any ground disturbance activities on all affected parcels.

LAND-3 The project owner shall obtain the necessary approval(s) from the City of Roseville and complete any lot merger or lot line adjustments necessary to ensure that the proposed project facilities, but excluding linear facilities, will be located on a single legal lot and owned by one entity.

Verification: At least 30 days prior to the start of construction, the Project Owner shall provide the CPM with proof of completion of the above adjustments or satisfactory evidence that no such adjustments are necessary. Prior to submitting an application to the City, the project owner shall submit the proposed lot configuration to the CPM for review and approval.

REFERENCES

California Energy Commission, Sacramento, California (CEC) 2003a. Application for Certification for the Roseville Energy Park Project Volume I & II. November 19, 2003.

California Department of Education, School Facilities Division. Personal conversation with Mr. Michael O'Neill. April 22, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. February 6, 2004.

City of Roseville General Plan, 2003 (as amended).

City of Roseville Planning Department. Personal conversation with Mr. Vance Jones. April 22, 2004.

City of Roseville Zoning Ordinance. Roseville Municipal Code. 1996.

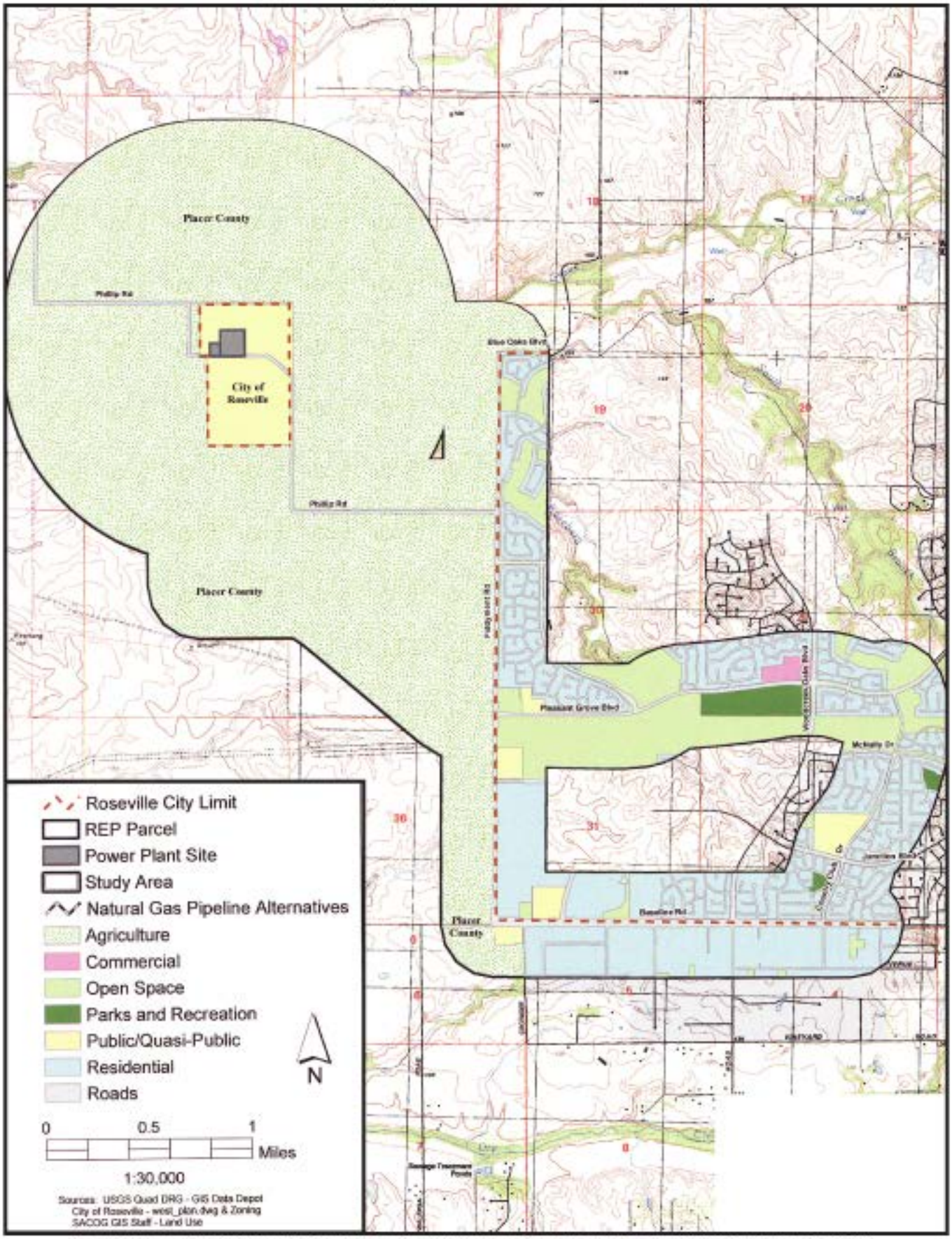
County of Sacramento Planning Department, Personal conversation with Debra Landin. April 22, 2004.

Galati & Blek, Sacramento, California (G&B) 2004a. Applicant's Status Report #2 for the Roseville Energy Park. March 25, 2004.

Sacramento Area Council of Governments. Personal conversation with Mr. Greg Chew. April 21, 2004.

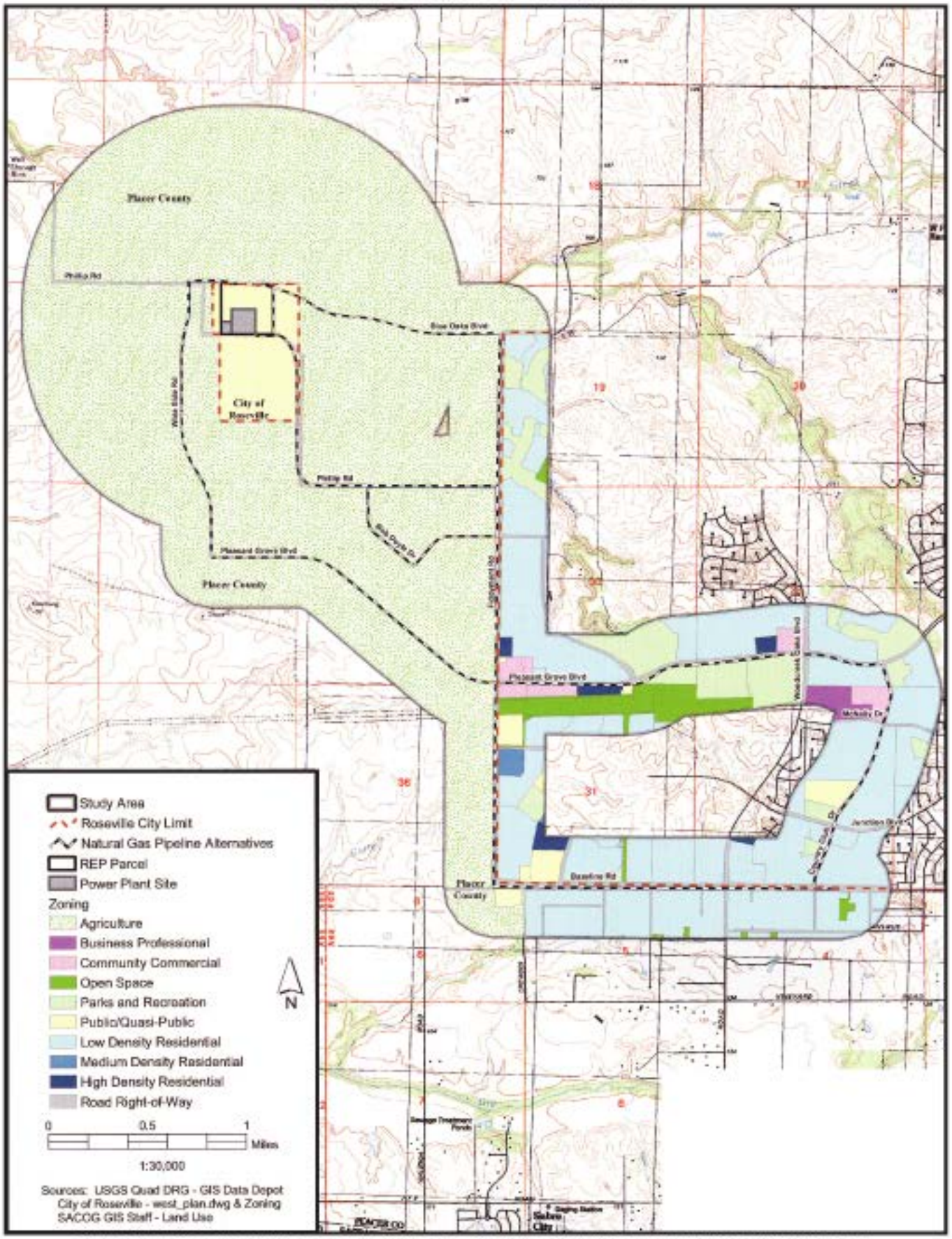
West Roseville Specific Plan, Volume I and II, 2003. Environmental Impact Report, September 2003.

LAND USE - Figure 1
Roseville Energy Park - General Plan Land Use Map



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: Roseville Energy Park AFC, Figure 8.6-2

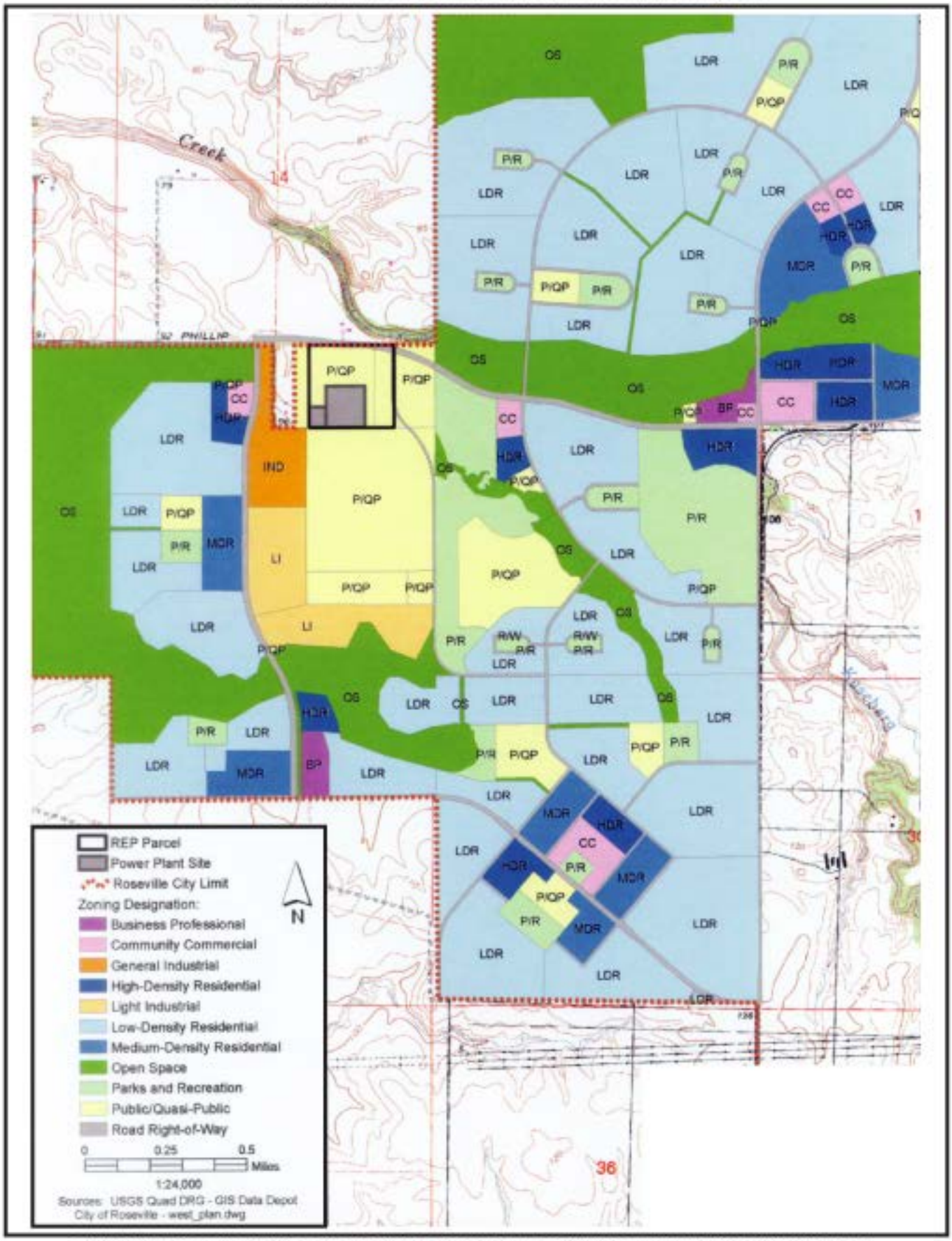
LAND USE - Figure 2
Roseville Energy Park - Zoning Map



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: Roseville Energy Park AFC, Figure 8.6-3

LAND USE - Figure 3

Roseville Energy Park - West Roseville Specific Pan Zoning Map



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Roseville Energy Park AFC, Figure 8.6-5

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab, Kevin Robinson and Steve Baker

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant 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 Roseville Energy Park (REP), 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 employed in this testimony, please refer to **NOISE Appendix A** immediately following.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time 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.

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 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 land use compatibility guidelines are listed in **NOISE Table 1**.

NOISE Table 1
Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (dB)													
	50		55		60		65		70		75		80	
Residential - Low Density Single Family, Duplex, Mobile Home														
Residential - Multi-Family														
Transient Lodging – Motel, Hotel														
Schools, Libraries, Churches, Hospitals, Nursing Homes														
Auditorium, Concert Hall, Amphitheaters														
Sports Arena, Outdoor Spectator Sports														
Playgrounds, Neighborhood Parks														
Golf Courses, Riding Stables, Water Recreation, Cemeteries														
Office Buildings, Business Commercial and Professional														
Industrial, Manufacturing, Utilities, Agriculture														

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

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

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of a simple tone, or "pure tone," in terms of 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 dBA.

Other State LORS include the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

Cal-OSHA

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see **NOISE Appendix A, Table A4**).

LOCAL

City of Roseville General Plan

Chapter IX of the City's General Plan (Roseville 2003) is the City of Roseville's Noise Element. The applicable noise standards for various uses are expressed in Table IX-3, Performance Standards for Non-Transportation Noise Sources, summarized below in **NOISE Table 2**. These standards declare that noise impacts on noise-sensitive receptors be no greater than 50 dBA L_{eq} during daytime hours (7 a.m. to 10 p.m.), and no greater than 45 dBA L_{eq} during nighttime hours (10 p.m. to 7 a.m.).

NOISE Table 2
City of Roseville Noise Performance Standards

Noise Level Descriptor*	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum level, dB	70	65

*Measured at the property line of the noise-sensitive receptor

City of Roseville Noise Regulation

The City's Noise Ordinance restricts the times of day, and the days of the week, that construction may occur near residentially-zoned property (Roseville 2001, § 9.24.030 G). Construction is permitted:

- weekdays between 7:00 a.m. and 7:00 p.m.; and
- weekends between 8:00 a.m. and 8:00 p.m.

The Noise Regulation repeats the standards of the General Plan Noise Element shown in **NOISE Table 2** (Roseville 2001, § 9.24.100, Table 1). Further, the Noise Regulation

prohibits noise created on industrially-zoned land, when heard at a sensitive receptor that is adjacent or is separated by a roadway, to cause the noise level at the property line of the sensitive receptor to exceed the ambient level by 7 dBA, or to exceed the standards (**NOISE Table 2**) by 7 dBA, whichever is greater (Roseville 2001, § 9.24.120).

Placer County Noise Ordinance

The Placer County Noise Ordinance sets Sound Level Standards for sound that causes the ambient noise level to increase by 5 dBA, or that exceeds certain values, as shown in **NOISE Table 3** below, whichever is greater (Placer 2004a, § 9.36.060, Table 1):

NOISE Table 3
Placer County Sound Level Standards

Noise Level Descriptor*	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	55	45
Maximum level, dB	70	65

*Measured at the property line of the noise-sensitive receptor

This ordinance, however, will not apply to the REP. The Applicant provided staff with a letter from Placer County (Placer 2004b) explaining that, since the source of the noise lies within the City of Roseville, the County deems the ordinance not applicable to the project.

SETTING

PROJECT BACKGROUND

The Roseville Energy Park involves the construction and operation of a nominal 120-125 MW baseload/160 MW peaking combined cycle power plant. The REP would include either two General Electric LM6000PC Sprint or two Alstom GTX100 gas turbine generators with heat recovery steam generators (HRSGs), and one steam turbine generator with a mechanical draft evaporative cooling tower. Also included in the project would be a natural gas compression station (Roseville 2003a, AFC §§ 1.1, 2.1, 2.2.1, 2.2.2, 2.2.6).

The equipment that has the greatest potential to generate significant noise levels includes the gas turbines, HRSGs, steam turbine, pumps, main transformers, natural gas fuel compressors, wet cooling tower, and a zero liquid discharge facility (Roseville 2003a, AFC § 8.7.2.3).

Power Plant Site

The project site is located within the City of Roseville, on land owned by the City. It is zoned Public/Quasi-Public, and is directly north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). Surrounding land uses currently include ranching (agricultural grazing) and rural residential. Agricultural land to the north of the site is

located in unincorporated Placer County. To the west, east, and south of the project and the PGWWTP is a 3,100-acre area called West Roseville, which will be developed for residential, industrial, and commercial uses over 15 years under the West Roseville Specific Plan (WRSP) (Roseville 2003a, AFC §§ 1.1, 2.2.1, 8.6.1.2, 8.7.1).

Linear Facilities

Linear facilities included in the project would consist of the following:

- a 50-foot-long pipeline to supply tertiary treated recycled wastewater from the City of Roseville's adjacent PGWWTP;
- a 60 kV switchyard to deliver the plant's power directly to the grid through a double-circuit 60kV transmission line located adjacent to the project site;
- approximately 6 miles of 10- to 16-inch diameter underground natural gas pipeline to deliver fuel from the existing PG&E gas distribution line 123 to the project site;
- an approximately 800 foot pipeline to convey sanitary waste water to the PGWWTP's influent junction structure, located east of the project site (Roseville 2003a, AFC §§ 1.1, 2.2.5, 2.2.6, 2.2.7).

EXISTING NOISE LEVELS

In order to predict the likely effects of project noise on adjacent sensitive receptors, the applicant commissioned an ambient noise survey of the area. The survey was conducted on Thursday and Friday, July 10 and 11, 2003, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following four locations, shown on **NOISE Figure 1**:

1. Location 1: Adjacent to residence and dog kennel at 5480 Phillip Road, approximately 1,115 feet northwest of a point midway between the two HRSG stacks of the power plant (assumed, for purposes of modeling power plant noise emissions, as the point source of plant noise). Existing noise is due primarily to the barking of dogs housed in indoor kennel spaces located 300 feet north of the monitoring site and outdoor pens located within 50 feet of the monitoring site; intermittent traffic on Phillip Road, 330 feet west of the monitoring site; occasional aircraft; and infrequent noise related to construction of the PGWWTP.
2. Location 2: Adjacent to residence at 5490 Phillip Road, approximately 1,125 feet north of a point midway between the two HRSG stacks of the power plant. Existing noise is due to the same sources as at Location 1.
3. Location 3: Adjacent to residence at 4900 Phillip Road, approximately 1,815 feet northeast of a point midway between the two HRSG stacks of the power plant. The primary existing sources of noise in this location are birds and insects. Secondary sources include intermittent traffic on Phillip Road, occasional aircraft, and infrequent noise related to construction of the PGWWTP.
4. Location 4: On the center point of the south boundary of the site, approximately 440 feet south of a point midway between the two HRSG stacks of the power plant. It is not located near any sensitive receptor and was selected to provide data representative of traffic on Phillip Road. Existing noise consists primarily of intermittent traffic on Phillip Road. Secondary sources include low-level pump

noise at the PGWWTP, air conditioning units on distant construction trailers, birds, insects, occasional aircraft, and infrequent noise related to construction of the PGWWTP (Roseville 2003a, AFC § 8.7.1).

NOISE Table 4 summarizes the ambient noise measurements (Roseville 2003a, AFC § 8.7.1.2, Table 8.7-1).

NOISE Table 4
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA		
	Average During Nighttime Hours		Community Noise Equivalent Level (CNEL)
	L_{eq}	L_{90}	
1 – 5480 Phillip Road residence	41.1	37.6	50.8
2 – 5490 Phillip Road residence	37.8	35.6	46.8
3 – 4900 Phillip road residence	38.8	35.9	49.1
4 – South boundary of site	44.1	40.4	52.7

Source: Roseville 2003a, AFC Table 8.7-1 and staff calculations

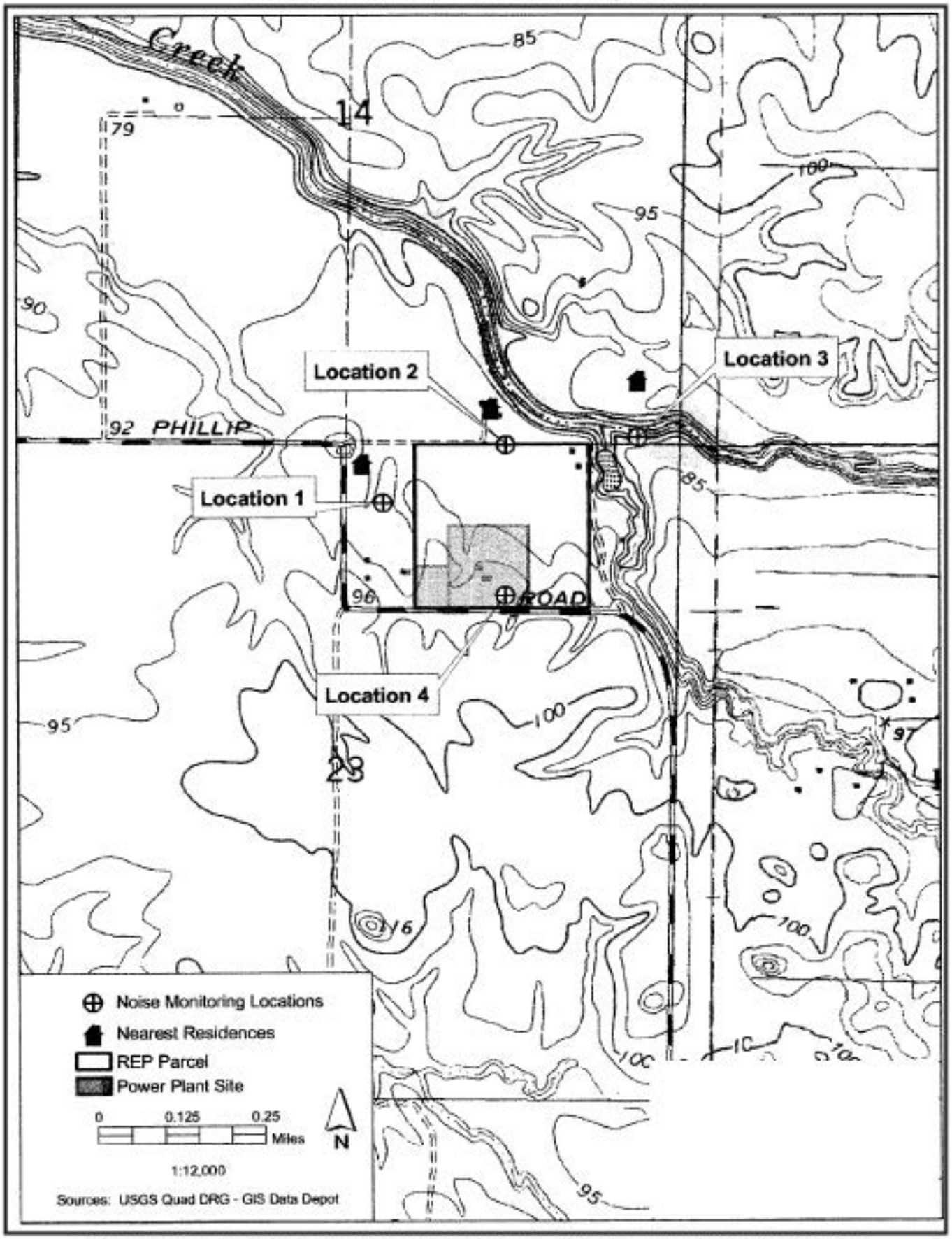
In general, the noise environment in the vicinity of the project site is dominated by dogs barking, traffic, and aircraft noise during the day and by insect noise at night. The area is relatively quiet at the present time because of its distance from typical urban activities.

EXPECTED FUTURE AMBIENT NOISE LEVELS

Proposed West Roseville Specific Plan (WRSP)

On February 23, 2004, the Roseville City Council passed the West Roseville Specific Plan (WRSP), a 3,162-acre plan for the development of the land that lies to the west, south and east of the REP. Construction of the residential, commercial and professional buildings, parks, schools and other uses that will comprise the WRSP is expected to commence in summer 2004, with the first residents moving into their new homes in 2005. The REP is expected to begin construction in the spring of 2005, and to commence commercial operation in January 2007 (Roseville 2003a, AFC §§ 1.4, 1.6.3). Since WRSP sensitive receptors (especially residences) will exist before the REP begins operation, it is necessary to analyze the likely noise impacts of the project on these new receptors. For this reason, staff submitted a data request to the applicant (DR #48) requesting that the applicant predict the project's noise impacts on WRSP receptors.

NOISE - Figure 1
Roseville Energy Park - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: Roseville Energy Park 03-AFC-1, Figure 8.7-1

In response to staff's data request, the applicant performed noise modeling to estimate project noise levels at the nearest planned WRSP residential areas to the west, northeast, east and southwest of the REP site (CH2MHill 2004a, DR #48). These projections are shown in **NOISE Table 10**, later in this analysis. Estimates were developed based on modeled noise levels assuming only geometric spreading losses. The estimates are, therefore, conservative, as atmospheric and other attenuating effects are not considered.

These predicted future roadway noise levels, as indicated in the WRSP EIR, for roadways adjacent to or near these residential areas, account for the increase in ambient noise that will be present in the future, when West Roseville is fully developed.

IMPACTS

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
2. exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item c) 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 L_{90} or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is clearly significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level [1];
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites; and
5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

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

1 the construction activity is temporary;

2 use of heavy equipment and noisy activities is limited to daytime hours; and

3 all industry-standard noise abatement measures are implemented for noise-producing equipment.

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

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

Community Effects

General Construction Noise

Construction noise is usually considered a temporary phenomenon. Construction of the REP is expected to last approximately 18 to 21 months (Roseville 2003a, AFC §§ 1.4, 8.7.2.2). 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 City of Roseville Noise Ordinance places no limit on the level of construction noise, but limits such noise to certain hours (Roseville 2001, § 9.24.030.G). As described above, construction hours are restricted to:

- weekdays 7:00 a.m. to 7:00 p.m.
- weekends 8:00 a.m. to 8:00 p.m.

The applicant has predicted construction noise impacts at the sensitive receptors (Roseville 2003a, AFC Table 8.7-3). These predicted construction noise impacts are summarized in **NOISE Table 5**.

[1] 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.

NOISE Table 5
Construction Noise Impact Predictions

Location	Distance from Noise Source (feet)	Loudest Predicted Sound Level, dBA*
5480 Phillip Road residence	1115	62
5490 Phillip Road residence	1125	62
4900 Phillip Road residence	1815	58

Source: Roseville 2003a, AFC Table 8.7-3
*Does not include steam blows

The loudest predicted sound levels at these receptors vary from 58 to 62 dBA. During the daytime, when noisy construction work is performed, L_{eq} levels at these locations range from 40 dBA to as high as 50 dBA (Roseville 2003a, AFC Table 8.7-1). Construction noise levels will be 8 to 22 dBA above the existing daytime L_{eq} levels. While these noise levels may be annoying at times, staff believes that the use of construction equipment equipped with adequate mufflers in good condition, and adherence to the time-of-day restrictions cited in the Roseville Noise Ordinance, would represent adequate feasible mitigation. Construction noise impacts would then be deemed insignificant. To ensure this mitigation occurs, staff proposed Condition of Certification **NOISE-8**. In the event that nearby residents are still annoyed by construction noise, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish an effective noise complaint resolution process.

Steam Blows

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

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam was then raised in the heat recovery steam generator or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, was quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, was performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line was connected to the steam turbine, which was then ready for operation.

These high-pressure steam blows could produce noise as loud as 136 dBA at a distance of 50 feet. In order to reduce disturbance from steam blows, the applicant has committed to equipping the steam blow piping with a silencer that would reduce noise levels by approximately 30 dBA (Roseville 2003a, AFC § 8.7.2.2).

In recent years, a new, quieter steam blow process, variously referred to as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower

pressure steam over a continuous period of 36 hours or so. Resulting noise levels reach about 80 dBA at 100 feet. Noise levels at nearby receptors are typically similar to the ambient background noise level, and thus barely noticeable. Even more recently, compressed air has been substituted for steam in the continuous blow process, with resulting noise levels that are similar.

The applicant has predicted steam blow noise levels at the nearest sensitive receptors; see **NOISE Table 6**. Comparing to ambient L_{eq} noise levels, it is seen that noise from high pressure steam blows would exceed normal daytime L_{eq} ambient noise at all three receptors by as much as 31 to 39 dBA (see **NOISE Table 4**). This represents short-term noise levels at these residences that are eight to sixteen times as loud as the ambient. While this might represent a substantial adverse impact, staff believes that the temporary nature of the noise, combined with the small number of receptors, makes such a process permissible.

NOISE Table 6
Steam Blow Noise Impact Predictions

Location	Distance from Source (feet)	Predicted Sound Level, dBA	
		High Pressure Steam Blow	Low Pressure Steam Blow
5480 Phillip Road Residence	1115	79	53
5490 Phillip Road Residence	1125	79	53
4900 Phillip Road Residence	1815	75	49

Source: Roseville 2003a, AFC Table 8.7-3

In order to minimize annoyance due to steam or air blows, staff proposes conditions of certification to limit noise from the short duration, high-pressure steam blows by requiring the use of a temporary silencer to achieve the noise level cited above, to implement a notification process to make neighboring land uses aware of impending steam blows (see proposed Conditions of Certification **NOISE-4** and **NOISE-5** below), and to restrict such work to daytime hours (see proposed Condition of Certification **NOISE-8**). If a low-pressure, continuous steam or air blow process is used, the proposed Condition of Certification **NOISE-4** will ensure that the resulting continuous noise levels do not exceed the LORS nighttime noise standards, or cause a significant increase in nighttime ambient noise levels. This should ensure the process is tolerable to residents and adjacent land uses.

REP's Construction Noise Impacts on West Roseville Neighborhoods

REP construction noise will cause a temporary adverse noise impact on the nearest WRSP sensitive receptors. At the time the REP construction gets underway, some of the WRSP residential buildings may be under construction, in which case there will be no people residing there. At the same time, other buildings may have already been built and occupied, in which case the implementation of the planned sound mitigation measures between the West Roseville neighborhoods and the REP (as described below and in the AFC) will be well under way. These measures will help to mask the

construction noise from the REP. Therefore, the expected adverse impacts from the construction of the REP will likely have less impact on these residences than on the existing three receptors, and will thus allow construction to proceed without significant adverse impacts.

In addition, the construction activities are temporary, the use of heavy equipment and noisy activities will be limited to daytime hours (Roseville 2003a, AFC § 8.7.2.2), and all industry-standard noise abatement measures will be implemented for noise-producing equipment.

Staff concludes that noise due to the REP's construction activities would have an insignificant adverse impact on the West Roseville neighborhoods.

Linear Facilities

New off-site linear facilities would include an 800 foot sanitary wastewater discharge pipeline, a 50 foot tertiary treated recycled wastewater pipeline, a 60 kV transmission line, and approximately six miles of natural gas pipeline.

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, the City's Noise Ordinance § 9.24.030 G (Roseville 2001) limits the hours of construction; see **NOISE Table 7**.

NOISE Table 7
Restriction of Construction Hours

Day	Permissible Hours of Construction
Monday – Friday	7 a.m. to 7 p.m.
Saturday and Sunday	8 a.m. to 8 p.m.

Source: Roseville 2001

To ensure compliance with the remaining applicable restrictions, staff proposes Condition of Certification **NOISE-8**.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. The applicant anticipates no pile driving will be required for construction of the REP (Roseville 2003a, AFC § 8.7.2.2); therefore, no vibration impacts are likely.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (Roseville 2003a, AFC Table 8.7-5; §§ 8.7.5.1, 8.7.5.2). To ensure that construction workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-3**.

PROJECT SPECIFIC IMPACTS — OPERATION

Community Effects

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Nighttime ambient noise levels are typically lower than the daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's projected noise level. This assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep.

In addition, staff compares the projected project noise with applicable LORS, in this case, the City of Roseville General Plan and Noise Ordinance.

Power Plant Operation

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

The primary noise sources of the project include the gas turbine generators, the steam turbine generator, gas turbine air inlets, HRSG exhaust stacks, the natural gas fuel compressors, electrical transformers, and various pumps. The noise emanating from a power plant during normal operation is generally broadband, steady state in nature.

The applicant performed noise modeling to determine the project's noise impacts on currently existing sensitive receptors (Roseville 2003a, AFC Table 8.7-4). Calculations were based on typical manufacturer noise data for the major equipment (Roseville 2003a, AFC Appendix 8.7-A). These projections are shown in **NOISE Table 8**.

NOISE Table 8
Applicant's Plant Operational Noise Impacts (dBA)

Receptor	Ambient Nighttime Background (L_{90})	Projected Power Plant Noise Level (L_{eq})	Increase over Ambient
5480 Phillip Road Residence	37.6	50.6	13
5490 Phillip Road Residence	35.6	50.0	14.4
4900 Phillip Road Residence	35.9	46.6	10.7

Source: Roseville 2003a, AFC Table 8.7-4

The applicant's ambient nighttime background values (see **NOISE Table 4**) were an average of all nine nighttime hours (Roseville 2003a, AFC Table 8.7-1). Inspection of the individual graphs of one-hour statistical measured sound levels (Roseville 2003a, AFC, Figures 8.7-6 through 8.7-9), however, shows that the background (L_{90}) levels are relatively low for a period of four or five hours centered around 2 a.m., with increasing levels before and after this time span. This is to be expected where late evening and early morning commute traffic influence the background noise. In such case, Energy Commission staff commonly averages background noise levels of the four quietest hours of the night, to exclude effects of commute traffic. With this adjustment figured in, staff's predicted operational noise impacts are summarized in **NOISE Table 9**.

NOISE Table 9
Staff's Plant Operational Noise Impacts (dBA)

Receptor	4-hour Ambient Nighttime Background (L_{90})	Projected Power Plant Noise Level (L_{eq})	Resultant Noise Level (L_{eq})	Increase over Ambient
5480 Phillip Road Residence	36.3	50.6	50.6	+14
5490 Phillip Road Residence	34.5	50.0	50.0	+15
4900 Phillip Road Residence	34.3	46.6	46.6	+12

Source: Roseville 2003a, AFC Table 8.7-1 and staff calculations

Compliance with City Noise Element

The City's Noise Element declares that noise impacts on noise-sensitive receptors be no greater than 50 dBA L_{eq} during daytime hours (7 a.m. to 10 p.m.), and no greater than 45 dBA L_{eq} during nighttime hours (10 p.m. to 7 a.m.). These limits are incorporated in the City Noise Ordinance (below).

Compliance with City Noise Ordinance

The City's Noise Ordinance specifies that, where an industrially zoned area borders a residential area, the noise limits increase by 7 dBA over the General Plan requirements. That is, hourly L_{eq} level limits would be 57 dBA during the day and 52 dBA at night (Roseville 2001, § 9.24.120). (For a continuous, steady-state noise source such as a power plant, the L_{eq} and L_{90} values are comparable to each other). Based on the above projected power plant noise levels, it is seen that the power plant noise levels at the three sensitive receptors (ranging from 46.6 to 50.6 dBA nighttime L_{eq}), would be lower than the City of Roseville's Noise Ordinance requirement of 52 dBA, and thus in compliance with this ordinance.

Compliance with CEQA

As described above (under California Environmental Quality Act), staff considers it reasonable to assume that an increase in background noise levels of more than 10 dBA is clearly significant. The projected power plant noise levels will increase the existing ambient noise levels by 12 to 15 dBA at the three existing residences (see **NOISE Table 9**). Staff considers this increase significant and asked the applicant to propose feasible measures for the three existing affected residences to mitigate project noise impacts to the extent feasible, in order to comply with CEQA requirements.

Applicant's Proposed Mitigation

The applicant has offered to provide additional sound attenuation at residences whose occupants complain of disturbance from increased noise due to the project's operation (G&B 2004a). The specific attenuation measures would be case-specific, and could include: replacement of single-pane windows with dual-pane windows; replacement of hollow-core doors with solid-core doors and weather stripping; installation of air conditioning; and additional sound insulation in exterior walls. These treatments could be expected to reduce interior noise levels by 5 to 10 dBA, but would have no effect on project noise levels outdoors. In addition, staff proposes that exterior sound barriers be included as possible measures. Staff proposes Condition of Certification **NOISE-9** to ensure that the Applicant offers this mitigation to nearby residents. Staff believes this would constitute adequate feasible mitigation of impacts.

Proposed West Roseville Specific Plan

In response to staff's data request, the applicant performed noise modeling to estimate noise levels on the nearest planned WRSP residential areas to the west, northeast, east and southwest of the REP site (CH2MHill 2004a, DR #48). These projections are shown in **NOISE Table 10**.

These noise estimates are compared with predicted future noise levels, as indicated in the WRSP EIR, for roadways adjacent to or near these residential areas, to account for the cumulative increase in ambient noise from roadways and other sources that will be present in the future, when West Roseville is fully developed. The sound level due to the REP will be significantly lower than the predicted future (2020) traffic noise level at 100 feet from the roadway centerline adjacent to the nearest planned residential areas to the REP (See **NOISE Table 10**).

NOISE Table 10
Plant Operational Noise Impacts on
Proposed WRSP Residential Development

Type of Residential Use	Direction	Distance (feet)	REP Sound Level (L_{eq}, dBA)	2020 Traffic Noise Level (L_{eq}, dBA)[1]
High Density	West	1500	48	61[2]
Low Density	Southwest	1725	47	61[2]
Low Density	Northeast	1875	46	55[3]
Low Density	East	2850	43	56[4]

Source: REP 2004b, Table DR48-1
1. Source: Table 4.5-11, West Roseville Specific Plan and SOI Amendment Area EIR. L_{eq} derived from L_{dn} estimates at 100 feet from roadway centerline.
2. West Side, Pleasant Grove to Blue Oaks
3. Hayden, North of Blue Oaks
4. Hayden, South of Blue Oaks

Since the nearest WRSP receptors are more distant than the nearest existing residences that were modeled in the AFC (the nearest is 1,500 feet distant as compared to 1,115 feet), project noise impacts on WRSP receptors will be less than impacts on the nearest existing residences. Where current nighttime ambient noise levels at the nearest existing receptors are in the range of 34 to 36 dBA (**NOISE Table 9**, above), staff estimates that ambient levels in the WRSP neighborhoods will range around 40 dBA, a typical level for such development. The project-related noise level of 48 dBA (**NOISE Table 10**, above) would thus result in combined noise levels of 49 dBA, an increase of 9 dBA. While this may constitute a noticeable increase (i.e., residents could notice when the power plant is operating), staff believes that it will not be a source of annoyance.

The WRSP EIR includes several specific mitigation measures that require the project developer to demonstrate that residential noise levels will be consistent with City's standards. Specific recommendations include an acoustical study that addresses adequate setbacks, soundwalls/barriers and building orientation. In addition, residences in the Village Center that front roadways are required to implement many architectural and acoustic design measures (sound-rated windows, solid core doors, air conditioning, etc.). These design measures are estimated to provide up to 30 dB reduction from outside to inside levels (CH2MHill 2004a).

Additional noise attenuation will result from the erection of 6-foot-high masonry walls between the arterial and collector streets in West Roseville and the residential areas. Where these noise barriers break the line of sight between the REP and the receptor (for example, backyard of a residence shielded by a barrier), they can cause a noise reduction of 5 dBA. Intervening structures will also serve as noise barriers. For example, commercial or industrial buildings located west of the REP would likely block noise stemming from sources at the REP that are elevated, such as the air inlets. The first row of residences will also shield subsequent rows.

Therefore, staff concludes that noise levels from the REP, in combination with the expected WRSP noise levels, will result in an insignificant adverse impact on the future West Roseville Specific Plan residential neighborhoods.

Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. Intermittent noises would include steam relief valves venting during startup, shutdown or unplanned unit trips. The applicant plans to address overall noise in design, and to install appropriate vent silencers to eliminate these factors as possible sources of annoyance (Roseville 2003a, AFC §§ 8.7.2.3, 8.7.4).

Linear Facilities

All water and gas piping will lie underground, and will be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line, and will thus be inaudible to any receptors.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration), and through the air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas and steam turbines, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate and have permanent vibration sensors attached to the turbines and generators. The applicant states that it is unlikely that any vibration would be felt beyond about 100 feet from the equipment. (Roseville 2003a, AFC § 8.7.2.3). Energy Commission staff agrees with this estimate, and agrees with the applicant that groundborne vibration from the REP will be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The REP's chief source of airborne vibration would be the gas turbines' exhaust. In a combined cycle plant such as the REP, however, the exhaust must pass through the HRSGs and selective catalytic reduction (SCR) modules before it reaches the atmosphere. The HRSGs and SCRs act as extremely efficient silencers; it would be exceedingly rare for such a plant to cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (Roseville 2003a, AFC §§ 8.7.5, 8.7.5.1, 8.7.5.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. The applicant would also implement a comprehensive hearing conservation program. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-7**.

CUMULATIVE IMPACTS

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual

impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

Pursuant to CEQA, a cumulative impacts analysis can be performed by either 1) summarizing growth projections in an adopted general plan or in a prior certified environmental document, or 2) compiling a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this analysis.

One future project that staff is aware of that may have a direct cumulative impact on noise is the WRSP. The WRSP employs industrial and commercial areas, as well as recreational parks, as buffers between the REP and the existing and future noise-sensitive receptors (Roseville 2003a, AFC § 8.7.3). Project noise impacts on the WRSP are analyzed above.

The only other project that staff is aware of that may have a direct cumulative impact on noise is the PGWWTP. The PGWWTP to the south of the project site will be completed before the REP construction begins. The applicant has described how noise levels from this facility (PGWWTP) are not expected to be significant at the three residences analyzed in this study, but they will raise the ambient noise level slightly. These higher ambient levels would help to mask noise from the REP (Roseville 2003a, AFC § 8.7.3).

Although the cumulative background noise levels in the project area will increase with the build-out of the West Roseville Specific Plan and operation of the PGWWTP, the noise levels will not increase beyond reasonably acceptable levels considered healthy and safe. Staff, therefore, agrees that no significant cumulative noise impacts are likely for the REP.

FACILITY CLOSURE

In the future, upon closure of the REP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the REP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the REP, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified.

RESPONSE TO COMMENTS

Roseville Electric (July 16, 2004): RE addressed staff's conclusion in the PSA (p. 4.6-20) that the project would violate the Placer County Noise Ordinance. RE produced a letter from the Placer County Deputy Executive Officer explaining that the County Noise Ordinance applies only to noise sources located within the County. As the REP is

located within the City of Roseville, the County Noise Ordinance does not apply. Accordingly, staff has reversed its conclusion that the project does not comply with the Placer County Noise Ordinance.

Roseville Electric (July 16, 2004): RE asked that staff's proposed Condition of Certification **NOISE-8**, specifying the hours during which noisy construction may be performed, be modified to acknowledge that, under section 9.24.160 of the City of Roseville Noise Ordinance, the City of Roseville may permit noisy construction to be performed outside the specified hours. Staff agrees that this is appropriate, and has so modified **NOISE-8**.

Roseville Electric (August 11, 2004): In its Supplemental Comments on staff's PSA, RE asks that, since the Placer County Noise Ordinance does not apply to the project (see comment above), the City of Roseville Noise Ordinance be invoked in determining acceptable noise levels at nearby sensitive receptors. Specifically, RE asks: 1) that the acceptable noise level be determined to be 7 dBA above the nighttime sound level standard specified in the Ordinance (Roseville 2001, § 9.24.120); 2) that proposed Condition of Certification **NOISE-6** be revised to acknowledge all three nearby sensitive noise receptors (residences); 3) that **NOISE-6** be revised to allow noise monitoring of the operating project at an alternate location (other than at an affected residence); and 4) that RE be allowed 30 days, instead of 15 days, to provide a report of this noise survey. Staff agrees with all these requests, and has modified proposed Condition of Certification **NOISE-6** accordingly.

Roseville Electric (August 11, 2004): Responding to staff suggestions at the July 20, 2004 PSA Workshop, RE proposed addition of Condition of Certification **NOISE-9**, which allows RE to address excessive noise at any of the three nearby residences by mitigating the residence, rather than attempting to mitigate the power plant itself. Accordingly, staff has added proposed Condition of Certification **NOISE-9**.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the REP can be constructed and operated in compliance with all applicable LORS. Staff further concludes that both construction and operation of the REP will likely result in significant adverse noise impacts on the three rural residences near the plant site. However, incorporation of the requirements embodied in staff's proposed Conditions of Certification would ensure that all necessary mitigation would be employed to reduce project noise impacts from both construction and operation of the REP to the extent feasible. The project would thus comply with CEQA.

There will be no significant cumulative impacts with other projects, and no significant direct or cumulative noise impacts to an environmental justice population.

To ensure compliance with all applicable noise LORS and mitigation of noise impacts to the extent feasible, staff recommends adoption of the following Conditions of Certification.

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, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the 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 related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program. The project owner shall make the program available to Cal-OSHA upon request.

STEAM BLOW MANAGEMENT

NOISE-4 If a traditional, high-pressure steam blow process is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 106 dBA measured at a distance of 50 feet. The project owner shall conduct steam blows only during the hours specified in Condition of Certification **NOISE-8**, unless the CPM agrees to longer hours based on a demonstration by the project owner that offsite noise impacts will not cause annoyance.

If a low-pressure continuous steam blow or air blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise levels from the steam or air blows alone will not exceed 53 dBA L_{eq} measured at the residence at 5480 Phillip Road. If the low-pressure process is approved by the CPM, the project owner shall implement it in accordance with the requirements of the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

STEAM BLOW NOTIFICATION

NOISE-5 Prior to the first high-pressure steam blow(s), the project owner shall notify all residents, school principals or business owners within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner.

The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Project owner shall notify residents, schools and businesses at least 15 days prior to the first high-pressure steam blow(s). Within five days of notifying these entities, the project owner shall send a letter to the CPM confirming that the residents, schools and businesses have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

NOISE RESTRICTIONS

NOISE-6 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation alone to exceed 52 dBA L_{eq} measured near the residences at 5480 Phillip Road (Monitoring Location 1), 5490 Phillip Road (Monitoring Location 2), and 4900 Phillip Road (Monitoring Location 3), and will comply with Section 9.24.120 of the Roseville Municipal Code.

No new pure-tone components may be introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring sites ML-1, ML-2 or ML-3, whichever represents the current residential use nearest the project site. This survey during power plant operation shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been introduced.

   The measurement of power plant noise for the purposes of demonstrating compliance with this Condition of Certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the nearest residence. However, notwithstanding the use of this alternative method for determining the noise level, the character of the plant noise shall be evaluated at the nearest residence to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from the noise survey indicate that the power plant noise level (L_{eq}) at the affected receptor exceeds the above value for any given hour during the 25-hour period, or that the noise standards of the LORS have been exceeded, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity. Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to

the City of Roseville Planning Department, and 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 these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 30 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-7 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction work relating to any project features including high pressure steam blows shall be restricted to the times of day delineated below unless specifically approved by the City of Roseville under the procedures set forth in section 9.24.160 of the Roseville Municipal Code:

Monday through Friday	7 a.m. to 7 p.m.
Saturday and Sunday	8 a.m. to 8 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. If an exception for specific activity is granted by the City of Roseville pursuant to section 9.24.160 of the Roseville Municipal Code, the project owner shall submit evidence of such approval to the CPM prior to conducting such activities.

NOISE-9 In the event legitimate noise complaints under Condition of Certification **NOISE-2** are made by the owners of any of the existing residences located at 5480 Phillip Road (Monitoring Location 1), 5490 Phillip Road (Monitoring Location 2), and 4900 Phillip Road (Monitoring Location 3) during operation of the REP, the project owner shall offer to pay for the following noise attenuating upgrades to the residences:

- Exterior sound barriers;
- Replacement of single-pane windows with dual-pane windows;
- Replacement of hollow-core exterior doors with solid-core doors and weather stripping;
- Air conditioning; and
- Additional sound insulation in exterior walls.

The owner of each residence may select any or all of the above upgrades that the residence owner decides, in his or her sole discretion, but after consulting with the project owner, are appropriate. The residence owner and the project owner shall select a mutually acceptable contractor to perform the upgrades. The project owner shall pay the cost of the upgrades.

A "legitimate complaint" refers to a noise caused by the REP project, as opposed to another source, and as verified by the CPM. A legitimate complaint constitutes either: a violation by the project of any noise Condition of Certification, which is documented by another individual or entity affected by such noise; or a minimum of three complaints over a twenty-four (24) hour period that are confirmed by the CPM, the project owner, or any local or state agency which would, but for the exclusive jurisdiction of the Commission, otherwise have the responsibility for investigating noise complaints or enforcing noise limitations.

Verification: Upgrades shall, unless impossible due to circumstances beyond the project owner's control, be installed within 6 months of the receipt of the complaint. In the first annual compliance report after the receipt of a complaint, the project owner shall include documentation certifying that: 1) the noise-attenuating upgrades were installed on the specified residence at the project owner's expense, 2) the noise attenuating upgrades were already a feature of the residence, 3) installation was offered but refused by an owner, or 4) residential use by the complainant was ceased. In the event noise-attenuating upgrades are not complete at the time the annual compliance report is issued, the report shall include a schedule for the completion of the upgrades and the documentation listed above shall be included in the next annual compliance report.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Roseville Energy Park
(03-AFC-1)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1-71. Submitted to the Docket on February 6, 2004.

Galati & Blek, Sacramento, California (G&B) 2004a. Roseville Electric's Supplemental Comments on the Preliminary Staff Assessment, pages 9-13. Submitted to the Docket on August 11, 2004.

Placer (Placer County). 2004 a. Placer County Noise Ordinance, Noise, Section 9.36, dated January 6, 2004.

Placer (Placer County). 2004 b. Letter from Holly L. Heinzen, Placer County, to Craig Robinson, City of Roseville, dated March 2, 2004.

Roseville (City of Roseville). 2001. City of Roseville Noise Ordinance, Chapter 9.24 Noise Regulation, dated 2001.

Roseville (City of Roseville). 2003. City of Roseville General Plan, Noise Element, dated 2003.

Roseville (Roseville Electric). 2003a. Application for Certification for the Roseville Energy Park (03-AFC-1). Submitted to the California Energy Commission, October 30, 2003.

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.
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. § 1910.95

PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

INTRODUCTION

The purpose of this Public Health analysis is to determine if toxic emissions from the proposed Roseville Energy Park (REP) would have the potential to cause significant adverse public health impacts or violate standards for public health protection in the project's impact area. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Although staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this Preliminary Staff Assessment (PSA), **Attachment A** at the end of this section provides information on the health effects of such pollutants. Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electric and magnetic fields are addressed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams are discussed in the **Soils and Water Resources** section. Facility releases in the form of hazardous and non-hazardous wastes are addressed in the **Waste Management** section.

The following describes staff's method of analyzing potential health impacts and the criteria used to determine their significance.

METHOD OF ANALYSIS

The **Public Health** analysis discusses toxic emissions to which the public could be exposed during project construction and routine operation. If toxic contaminants are released 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 set are called non-criteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, non-criteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

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

- Identification of the types and amounts of hazardous substances that a source could emit into the environment;
- Estimation of worst-case concentrations of project emissions into the environment using dispersion modeling;
- Estimation of the amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and

- Characterization of the potential health risks by comparing worst-case exposures to safe standards based on known health effects.

For REP and other sources, a screening level risk assessment is initially performed using simplified assumptions intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to the emissions. In reality, it is likely that the actual risks from the project will be much lower than the risks estimated by the screening level assessment. This overestimation is accomplished by identifying conditions that would lead to the highest, or worst-case risks, and then assuming them in the study. The process involves the following:

- using the highest levels of pollutants that could be emitted from the source;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer models which predict the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be highest;
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- assuming that an individual's exposure to cancer-causing agents would occur over a 70-year lifetime.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances, which could present a health hazard from non-inhalation pathways of exposure (see California Air Pollution Control Officers Association (CAPCOA) 1993, Table III-5). When these substances are present in facility emissions, the screening level analysis is conducted to include the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) non-cancer 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, which arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for non-cancer 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 (CAPCOA 1993, p. III-36). This means that such exposure limits would

serve to protect such sensitive individuals as infants, school pupils, the aged, and people suffering from illnesses or diseases, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in the medical and toxicological literature, and include specific margins of safety, which address the uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. They are, therefore, intended to provide a reasonable degree of protection against hazards that research has not yet identified. Each margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant exposures that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection can be expected if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety is assumed to exist between the predicted exposure and the estimated threshold 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 conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of the individual substances are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact in question.

For carcinogenic substances, the health assessment considers the risk of developing cancer and conservatively includes the previously noted assumption that the individual would be continuously exposure 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 terms of chances per million of developing cancer and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (known as “potency factor”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield the total cancer risk from the source being considered. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be considerably lower than those estimated.

The screening level analysis is performed to assess worst-case public health risk associated with the proposed project. If the screening analysis were to predict a risk of no significance, no further analysis would be necessary. However, if the risk were to be above the significance level, further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate estimate of the public health risk in question.

SIGNIFICANCE CRITERIA

Commission staff estimates the health effects of exposure to toxic emissions based on impacts to the maximally 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) non-cancer health effects, as well as cancer (long-term) health effects. The potential significance of project health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Non-Cancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a "hazard index" for the exposure being considered. A hazard index is a ratio obtained by comparing exposure from facility emissions to the reference (safe) exposure level for the toxicant. A ratio of less than one would signify a worst-case exposure below the safe level. The hazard indices for all toxic substances with the same types of health effect are added together to yield a total hazard index for the source being evaluated. This total hazard index is calculated separately for acute and chronic effects. A total hazard index less than one indicates that the cumulative worst-case exposure would be within safe levels. Under these conditions, health protection would be assumed even for sensitive members of the population. In such a case, staff would assume that there would be no significant non-cancer public health impacts from project operations.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance in establishing the level of significance for its assessed cancer risks. Title 22, California Code of Regulations, section 12703(b) states in this regard, 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 risk level is equivalent to a cancer risk of ten in one million, or $10x10^{-6}$. An important distinction from the provisions in Proposition 65 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 from the source in question. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than with Proposition 65.

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

LAWS ORDINANCES, REGULATIONS AND STANDARDS

The following Laws, Ordinances, Regulations and Standards (LORS) were established to protect against the impacts of the noted criteria pollutants and the air toxics-related impacts of specific concern in this analysis.

FEDERAL

The Clean Air Act of 1970 (42 U.S.C., section 7412)

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

STATE

California Health and Safety Code section 41700

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

California Health and Safety Code section 39650 et seq.

This section of the code mandates that the California Environmental Protection Agency (Cal-EPA) establish safe exposure limits for toxic, non-criteria air pollutants, and identify the best available methods for controlling their emission. These laws also require that the new source review rules for each air district include regulations establishing procedures for controlling the emission of these pollutants. The toxic emissions from natural gas combustion are listed in the California Air Resources Board's (CARB's) Toxic Emissions Factors (CATEF) database for natural gas-fired combustion turbines to allow for uniform assessment as emitted from combustion and non-combustion sources in the state. Cal-EPA has developed specific cancer potency estimates for assessing any cancer risk that these air toxics may pose at specific exposure levels. For toxic air pollutants that do not cause cancer, Cal-EPA established the previously noted no-effects levels (also known as reference exposure levels or RELs) for assessing the likelihood of producing health effects at specific exposure levels. Such health effects would be considered significant only when exposure exceeds these reference levels. Staff uses these Cal-EPA potency estimates and reference exposure values in its health risk analyses.

Health and Safety Code section 44300 et seq.

This section of the code requires facilities, which emit large quantities of criteria pollutants, and any amount of non-criteria pollutants, to provide the local air district an inventory of toxic emissions. Operators of such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks

involved. The ARB ensures statewide implementation of these requirements through the state's air districts.

California Code of Regulations, Title 22, section 60306

This section mandates that, whenever recycled water is used in an industrial cooling system involving the use of a cooling tower that creates a mist, disinfected tertiary recycled water shall be used. It also requires that when a cooling system uses recycled water in conjunction with a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator and chlorine, or other biocide shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.

LOCAL

Placer County Air Pollution Control District Rule 502

This rule requires safe exposure limits for toxic and other air pollutants, use of Best Available Control Technology (BACT) and New Source Review (NSR).

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 emission 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 influences population density and, therefore, the number of individuals potentially exposed to the project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

According to the information from the applicant (Roseville 2003a, pp. 1-1, 6-, 8.1-1, 8.6-1 through 8.6-8, pp. 8.6-13, 8.6-14, and 8.9-1), the REP is proposed for a 12-acre site within a 40-acre land parcel owned by the City of Roseville. This parcel is located in southwest Placer County, approximately 5 miles northwest of downtown Roseville. The site is adjacent to and north of the Pleasant Grove Wastewater Treatment Plant and is surrounded by agricultural land, which is sparsely populated. The closest of the few nearby residences is located approximately 850 feet to the northwest. The site is generally flat with rolling hills and an average elevation of 95 feet above sea level.

The applicant (Roseville 2003a pp. 8.9-5 and 8.9-6, and Appendix 8.1-G) has provided a listing of existing locations with sensitive receptors within a six-mile radius of the site. Three future locations of specific significance in this regard would be a new high school, which is planned for a site approximately 2,000 feet southeast of the project site and two elementary schools, each approximately 2,500 feet away southwest and northeast.

A sensitive receptor location, for purposes of a public health analysis, is an establishment that houses sensitive individuals such as children, the elderly, school pupils and individuals with respiratory diseases. The existing institutions in this regard were identified as day-care facilities, convalescent homes, and schools. Since these individuals are more sensitive than the average individual to the effects of environmental pollutants, their response is specifically considered in establishing the safe exposure limits for such pollutants, as noted earlier. However, staff holds all projects to the same health standards, whether proposed for a major population center, with many sensitive receptors, or a sparsely populated area with relatively few.

The West Roseville Specific Plan envisions approximately 8400 new residential units in the areas west, south, east, and northeast of the proposed REP site. The closest of these planned residential areas is located about 1000 feet west of the REP site. Tentative Subdivision Maps for the first phase of residential development in West Roseville (representing over 2100 housing units) have been filed with the City of Roseville. The maps cover the areas east of the REP and PGWWTP and west of Fiddyment Road and south of Blue Oaks Boulevard (extension). The closest of these housing units are located approximately 2100 feet east of the REP site. Housing construction is anticipated to begin in early 2005.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

The climate at the project site is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, which is a semi-permanent, subtropical high-pressure system located off the coast. The size and strength of the Pacific High is at a maximum during the summer when it is at its northernmost position and results in strong northwesterly airflow and negligible precipitation. During this period, inversions become strong, winds blow lightly, 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 80 percent of the region's annual rainfall of about 12 inches occurs between November and March. During the winter months, 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 below which the air is well mixed and in which pollutants can be dispersed) are lower during the morning hours because of temperature inversions, which are followed by temperature increases in the warmer afternoons. Staff's **Air Quality** section presents a more detailed discussion of the area's meteorology.

EXISTING AIR QUALITY

The proposed project site is within the jurisdiction of the Placer County Air Pollution Control District (PCAPCD). Using data on average concentrations of toxic pollutants measured at air monitoring sites, the health risk from existing pollutant exposures can be evaluated. For the toxic pollutants of specific concern in this analysis, the numerical cancer risk from such existing, or background exposures can be estimated. The nearest monitoring data to the proposed project area is on Hazelton Street in Stockton approximately 40 miles from the project site. Based on the measured 2000 levels, the California Air Resources Board (CARB 2002) estimated the theoretical air toxics-related inhalation-only cancer risk as approximately 185 in a million in the area. This risk estimate can be compared with the normal background lifetime cancer risk (from all cancer causes) of one in four, or 250,000 in a million, as will be noted later.

According to available information, the pollutants, 1,3-butadiene and benzene (emitted primarily from mobile sources) contribute the most to this air toxics-related background risk, accounting together for over one half of the total. The risk from 1,3-butadiene by itself was estimated as 58 in a million, while the risk from benzene was about 54 in a million. Formaldehyde-related risk was estimated as 12 in a million, accounting for approximately 6.5 percent of the total. Formaldehyde is emitted directly from vehicles and other combustion sources such as the proposed REP.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease in ambient levels of air toxics and associated cancer risk during the past few years. For example, at the noted Stockton, monitoring station, the related cancer risk was estimated as 376 in a million from 1991 measurement data and 212 in one million from 1996 data and 185 from 2000 data. The potential risk from REP and similar sources should best be assessed in the context of their potential addition to these background risk levels.

IMPACTS

POTENTIAL IMPACTS OF PROJECT'S NON-CRITERIA POLLUTANTS

The health impacts of REP's non-criteria pollutants of specific concern in this analysis can be assessed separately as construction-phase impacts and operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (Roseville 2003a pp. 8.1-22, 8.1-40 and Appendix 8.1F), are those from human exposure to (a) the windblown dust from site excavation and grading, and (b) emissions from construction-related equipment. The dust-related impacts may derive from exposure to the dust itself as PM10, or exposure to any toxic contaminants that might be adsorbed on to it. Since, as more fully discussed in the **Waste Management** Section, the results from the Phase I and II Environmental Site Assessments for the proposed site (Roseville 2003a, pp. 8.14-1, 8.14-2 and Appendices 8.14-A, 8.14-B and 8.14C) did not identify any significant contamination, staff does not expect a significant health risk from soil-bound

contaminants in the construction phase. The only soil-related construction impacts of potential significance would derive from the possible impacts of PM10 as a criteria pollutant. As mentioned earlier, the potential for significant impacts from criteria pollutants is assessed in the **Air Quality** section.

The exhaust from diesel-fueled construction and other equipment has been established as a potent human carcinogen. Thus, construction-related emission levels should be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. Appendix 8.1-G (Roseville 2003a), presents the diesel emissions from the different types of equipment to be used in the construction phase. The maximum theoretical cancer risk from such diesel exhaust was calculated by the applicant as 5.2 in a million at the maximum impact location at the project fence line. Staff considers the recommended control measures (which are specified in **Air Quality** Condition of Certification AQ-SC3) as adequate to minimize the cancer risk during the relatively short (18- to 20-month) construction period for REP.

Operational Impacts

The main health risk from REP operations would be associated with emissions from its two combustion turbines and heat recovery steam generators, duct burners, testing of the emergency power generator and fire pump, and evaporative cooling tower. In addition to the toxic substances emitted from the cooling tower, there is specific concern that bacterial growth in the cooling water could lead to potential health effects from human exposure. This is discussed below in the section on cooling tower operation and risk of Legionnaires' disease.

Public Health Table 1 lists the project's toxic emissions and shows how each contributes to the risk estimated from 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) non-cancer health effects, but not acute (short-term) effects.

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, p. 6), one property that distinguishes the air toxics of concern in this analysis from the criteria pollutants is that the impacts from air toxics tend to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of REP's air toxics would be highest in the immediate area and would decrease rapidly with distance. One purpose of this analysis, as previously noted, is to determine whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of REP's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 California Air Pollution Control Officer's Association (CAPCOA) guidelines. The results from this assessment (summarized in staff's **Public Health Table 2**) were provided to staff along with documentation of the assumptions used (Roseville 2003a pp. 8.1-24 through 8.1-34, 8.9-1 through 8.9-15 and Appendices 8.1-C through 8.1- G). This documentation included:

- pollutants considered;
- emission levels assumed for the pollutants involved;
- dispersion modeling used to estimate potential exposure levels;
- exposure pathways considered;
- the cancer risk estimation process;
- hazard index calculation; and
- characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable (with the exception of certain of the chronic Reference Exposure Levels which staff updated and used to adjust the chronic Hazard Index) and has validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or a cancer risk for estimated levels of the carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

Public Health Table 1
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium			✔	✔	
Copper				✔	✔
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔	✔	✔	✔	
Mercury		✔		✔	✔
Napthalene		✔		✔	
Nickel			✔	✔	✔
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	

Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: Prepared by staff using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993, SRP 1998, and Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Risk Assessment Guidelines.

As shown in **Public Health Table 2**, the chronic hazard index for the maximally exposed individual is 0.023 while the maximum hazard index for acute effects is 0.048. These values are well below staff's significance criteria, suggesting that the pollutants in questions are unlikely to pose a significant risk of chronic or acute health effects anywhere in the project area.

Public Health Table 2
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
ACUTE NONCANCER	0.048	1.0	No
CHRONIC NONCANCER	0.023	1.0	No
INDIVIDUAL CANCER	0.074×10^{-6} (a) 0.63×10^{-6} (b)	10.0×10^{-6}	No

Staff's summary of information from Roseville 2003a pp. 8.1-38 through 8.1-40, 8.9-9 through 8.9-11and 8.6-59 through 8.6-8.and Appendix 8.1C through 8.1G.
(a) risk from normal project operations
(b) risk from diesel emergency generator testing

The cancer risk to the maximally exposed individual from normal project operation is shown as 0.074 in a million, which is well below staff's significance criterion for this screening level assessment. Thus, project-related cancer risk from routine operations would be insignificant for all individuals in the project area. Staff notes that the maximum risks from the assessed turbines and cooling towers occur at different locations, so adding these risk estimates together as done in this analysis further adds to the conservatism in the assessment process.

The highest project-related risk would be from exposure to the diesel exhaust from testing the project's emergency generator. Staff estimated this risk for the assumed testing period of 200 hours annually as 0.63 in a million. A similar risk for the fire pump was calculated as 0.02 in a million. As with routine operations, these risk estimates are well below staff's noted significance levels.

The conservatism in these assessments is further reflected in the fact that (a) the individual considered is assumed to be exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in humans and experimental animals, even when their cancer-inducing abilities have not been established in humans, and (c) humans are assumed to be as susceptible as the most sensitive experimental animal, despite knowledge that cancer potencies often differ between humans and experimental animals. Only a relatively few of the many environmental chemicals identified so far as capable of inducing cancer in animals have been shown to also cause cancer in humans.

Cooling Tower-Related Risk of Legionnaires' Disease

Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis, since cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water that is used for cooling towers operations according to requirements in Title 22, Section 60303, California Code of Regulations. These requirements mandate the use of chlorine or other biocides to an extent necessary to minimize the growth of Legionella and other microorganisms.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling, and not necessarily to control Legionella.

Effective mitigation measures should include a cleaning and maintenance program to minimize the accumulation of bacteria, algae, and protozoa that may contribute to nutritional needs of Legionella. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE 1998) emphasizes the need for such programs in its specifications for Legionellosis prevention. Also, the Cooling Tower Institute has issued Guidelines for the Best Practices for Control of Legionella (CTI 2000). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system as appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations.

Staff's recommended Condition of Certification **Public Health-1** is intended to ensure the effective maintenance and bactericidal action necessary during the operation of REP's cooling tower. This condition would specifically require the project owner to prepare and implement a cooling water management plan to ensure that bacterial growth is kept to a minimum in the cooling tower. With the use of an aggressive antibacterial program, coupled with routine monitoring and biofilm removal, the chances of Legionella growth and dispersal would be reduced to insignificance.

CUMULATIVE IMPACTS

As previously noted, the maximum impact location would be the spot where pollutant concentrations for the proposed REP would theoretically be highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, given the calculated incremental cancer risk of 0.074 in one million, which staff regards as not potentially contributing significantly to the previously noted average lifetime individual cancer risk of 250,000 in one million. Modeled facility-related residential risks are much lower for more distant locations. Given the previously noted conservatism in the utilized calculation method, the actual risks would likely be much smaller. Therefore, staff does not consider the incremental risk estimate for REP's operation as pointing to a potentially significant contribution to the area's cancer risk.

The worst-case long-term non-cancer health impact from the project (represented as a chronic hazard index of 0.023) is well below staff's significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any cumulative health impacts to be significant. As with cancer risk, long-term hazard would be lower at all other locations and cumulative impacts at other locations would also be less than significant.

COMPLIANCE WITH LORS

Since the cancer and non-cancer risks from REP operation reflect the effectiveness of proposed control measures (including an oxidation catalyst which reduces hazardous air pollutant emissions) proposed by the applicant or required by the applicable LORS, staff concludes that the proposed operational plan would comply with these LORS.

FACILITY CLOSURE

As noted in the introduction section, the toxic pollutants of primary concern in this analysis are those from routine operation of the proposed project. During temporary or permanent closure, the main concern would be over the non-routine releases of hazardous materials or wastes on site. Such releases are discussed respectively in the **Hazardous Materials** and **Waste Management** sections of this PSA. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. During permanent closure, the only emissions of potential significance would derive from demolition or dismantling activities and the equipment used. Such emissions would be subject to controls according to requirements in conditions adopted by the Energy Commission after a closure plan is received from the project owner.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments: The Applicant suggested specific changes in its August 11, 2004 comments on the Preliminary Staff Assessment to clarify the requirements in staff's proposed Conditions of Certification, **Public Health-1**. Staff agrees with the suggestions and has incorporated these clarifying changes into the condition.

Comments: In its October 18, 2004 letter to the Energy Commission, the Roseville Joint Union High School District expressed concern about the potential impacts of the project's emissions on the staff and students at a high school proposed for a site only 2,000 ft south east of the project site. The School District expressed additional concern about the accidents that could result from project-related ground-level road fog that could be encountered when students are transported to and from the proposed school.

Staff's Response: As noted in this staff analysis, the main measures of the health danger from the project's toxic (non-criteria) pollutant emissions are well below the levels of concern for the general public and the students who might be more sensitive to the impacts of such pollutants. This would be true for all locations in the project area including the proposed school site and would reflect the efficacy of the control measures proposed for the project's stack emissions and the cooling tower water vapor mainly responsible for any fog formation. The analysis and mitigation measures for the project's criteria pollutants are presented in the **Air Quality** section to reflect the adequacy of the control measures proposed by the applicant and recommended by the Energy Commission staff as specific conditions of certification.

The potential for the fog-related accidents is discussed in **Traffic and Transportation** section together with mitigation measures established as effective for such projects and the climatic conditions at issue.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of the proposed natural gas-burning REP are at levels that do not require mitigation beyond that already proposed by the applicant. The conditions for ensuring compliance with all applicable air quality standards are specified in the **Air Quality** section for the area's problem criteria pollutants. Implementation of staff's proposed condition of certification to reduce the likelihood of Legionella growth would ensure that the risk of Legionella growth and dispersion is reduced to levels of insignificance.

If the proposed project is approved, staff recommends the following Condition of Certification to address the risk from Legionella in the cooling tower.

PROPOSED CONDITION OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is controlled is kept to a minimum. The Plan shall be consistent with either Staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines.

Verification: At least 30 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

REFERENCES

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ATTACHMENT A - CRITERIA POLLUTANTS

OZONE (O_3)

Ozone is not directly emitted from specific sources but is formed when reactive organic compounds (VOCs) interact with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the relatively hot summer months. Ozone is a colorless, reactive gas with oxidative properties that allow for tissue damage in the exposed individual. The effects of such damage could be experienced as respiratory irritation that could interfere with normal respiratory function. Ozone can also damage plants and other materials susceptible to oxidative damage.

The U.S. EPA revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had became available since the standard was last revised in 1979. These new studies showed that adverse health effects could occur at ambient concentrations much lower than reflected in the previous standard, which was based on acute health effects experienced during heavy exercise. In proposing the new standard, the EPA identified specific health effects known to have been caused by short-term exposures (of one to three hours) and prolonged exposure (of six to eight hours) (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard, which is yet to be implemented.

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

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

CARBON MONOXIDE (CO)

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

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

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (known as PM10), which may be inhaled and deposited within the deep portions of the lung (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM10 can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter.

Coarse-mode PM10 is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as

well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

PM2.5 is derived both from combustion by-products, which have volatilized and condensed to form primary PM2.5, and from precursor gases reacting in the atmosphere to form secondary PM2.5. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM2.5 are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM10 from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM10 particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM10 fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The PM2.5 fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of PM2.5 deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of PM2.5 favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the PM2.5 from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by PM2.5 and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body's respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of PM2.5 concentrations as a more reliable surrogate for the health impacts

of the finer fraction of PM than PM10, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour PM2.5 standards to the existing annual and 24-hour PM10 standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM10 (CARB 1982, pp. 81, 84). These studies were aimed at establishing the PM10 levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs. §70200). These standards were set to be more stringent than the federal standard, which the ARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the ARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for PM2.5 (CARB 2002). The new standards took effect on July 5, 2003. The 24-hour PM10 standard was not changed. The standards were established to prevent excess death, illnesses such as respiratory symptoms, bronchitis, asthma exacerbation, and cardiac disease, and restrictions in activity from short- and long-term exposures (Title 17, Cal. Code Regs. §70200).

NITROGEN DIOXIDE (NO_2)

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

Sub lethal exposures in animals usually produce inflammations and varying degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, and p 5). The changes produced by low-level acute or sub chronic exposures appear to be reversible when the animal study subject is allowed to recover in clean air.
Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (CARB 1992, Appendix A, and p. 3).

These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies involving brief, controlled exposures on sensitive individuals have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, as well as decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an increased tendency of the airways to constrict) is markedly greater in asthmatics than in non-asthmatics upon exposure to initiating respiratory irritants (CARB 1992a, p. 107). At exposure concentrations of specific relevance to the current one-hour ambient standard, there appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

SULFUR DIOXIDE (SO_2)

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

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

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

Longer-term exposure is associated with increased incidence of respiratory symptoms (such as coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of premature mortality (CARB 1991a, p. 12). The long-term (24-hour) standard is based upon increased incidence of respiratory disease and premature mortality. The standard includes a margin of safety based on epidemiological studies, which have shown adverse respiratory effects at levels slightly above the standard. Some of the studies indicate a sulfur dioxide threshold for effects, suggesting that no significant effects are expected from exposures to concentrations at the state standard (Ibid.).

ATTACHMENT A - REFERENCES

CARB. 1982. California Air Resources Board. California Ambient Air Quality Standard for Particulate Matter (PM10). December 1982.

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SOCIOECONOMICS

Testimony of Joseph Diamond, Ph.D.

INTRODUCTION

This California Energy Commission (Energy Commission) staff socioeconomic impact analysis evaluates the project induced changes on community services and/or infrastructure and related community issues such as environmental justice and facility closure. Direct, indirect, induced, and cumulative impacts are also included. Staff discusses the estimated impacts of the construction and operation of the Roseville Energy Park (REP) project on local communities, community resources, and public services, pursuant to Title 14, California Code of Regulations, Section 15131. The REP project power plant and transmission line will be owned, and operated by Roseville Electric (RE), a department of the City of Roseville and a public agency, while the natural gas pipeline will be owned, and operated by PG&E.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

California Government Revenue and Taxation Code 202(a)(4) exempts city property from taxes. California Government Code section 65995(d) exempts facilities owned and occupied by agencies of local government from school impact fees.

ENVIRONMENTAL SETTING

The REP is located in the City of Roseville in Placer County, approximately 5 miles northwest of Roseville's city center. The REP site is owned by the City of Roseville. The affected area as defined by the REP project in the AFC and by staff is the greater Sacramento Area which includes El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties.[1] Sacramento and Placer Counties, and their major cities Sacramento and Roseville, are within a one-hour one-way commute distance of the power plant site, an area in which construction and operations workers may live. The applicant and staff utilized the Sacramento County and the Golden Sierra Consortium (Alpine, El Dorado, Nevada, Placer, and Sierra Counties), and North Central Consortium (Colusa, Glenn, Lake, Sutter, and Yuba Counties) labor market areas for its evaluation of construction and operation worker availability and community services and infrastructure impacts from construction and operation. Placer County was used as the study area in identifying non-fiscal (private sector) benefits from the REP.

ANALYSIS AND IMPACTS

Staff reviewed the REP AFC, Vol. I, Socioeconomic section and socioeconomic data adequacy responses (ROSEVILLE 2003a). Based on staff's use of the socioeconomic

[1] Most of the environmental and economic impacts identified are based on using Placer County as the study area because it is most likely to be impacted by the project. However, the economic impact analysis, which used IMPLAN, an input-output model explained later in this section, was done for Placer and Sacramento Counties due to the high economic interdependence. Staff accepts this rationale.

data provided and referenced from governmental agencies, trade associations and staff's independent analysis, staff agrees with the applicant's socioeconomic analysis and conclusions.

This staff analysis uses fixed percentage criteria for housing and environmental justice in evaluating potential impacts. For housing, staff uses a vacancy rate of five percent or less of permanent available housing, and for environmental justice, staff uses a threshold of greater than 50 percent for minority/low-income population in the affected area. Criteria for subject areas such as fire protection, water supply and wastewater disposal are analyzed in other sections of this staff assessment. Educational impacts are subjectively determined but are moot, as described later. Impacts on medical services, law enforcement, or community cohesion are based on subjective judgements or input from local and state agencies. Typically, substantial non-local employment has the potential to result in significant impacts to the study area.

EMPLOYMENT AND ECONOMY

According to the REP AFC and its Data Adequacy Supplement, most (an estimated 90 percent) pertinent crafts workers will come from within a one hour commuting distance (approximately 50 miles) to the REP project, though the remaining 10 percent could draw on the Golden Sierra Consortium or the North Central Consortium (ROSEVILLE 2003a and b).

The average commute time is defined as distances that involve up to a one-hour, one-way commute for construction and operations employees. However, construction workers generally commute as much as two hours (one-way). This defines the local labor market. Construction workers who live in communities at greater distances than a two-hour, one-way commute tend to relocate to the project area for the work week, then return home on the weekend. Operations workers tend to live within a one-hour, one-way commute, and if they live outside this area they would likely relocate. The "non-local" workers for the REP project will represent a small percentage for operations. Non-technical positions will be filled from the local workforce (Placer County) while the regional labor will supply the more technical positions (ROSEVILLEa).

The following **Socioeconomics Table 1** shows that available labor, by skill, in Sacramento County and The Golden Sierra Consortium is considerable when compared to the REP project needs.

SOCIOECONOMICS Table 1
Available Labor by Skill for Construction and Operations*

Occupational Title	Annual Averages 1999	2006 (Estimated)	Maximum (Monthly) Number Of Construction Workers Needed For The Project (includes power plant, recycled water pipeline, natural gas pipeline, and transmission lines)
Masons	560	740	5
Carpenters	7,600	10,840	12
Painters	2,010	2,620	4
Iron Workers, Structural Metal Workers	330	510	20
Electricians	3,400	4,560	30
Welders and Cutters	870	1,130	N/A
Boilermakers	N/A	N/A	20
Truck Drivers	12,930	17,020	2
Operating Engineers	830	1,110	8
Helpers, Laborers	29,060	38,010	15
Pipe fitters/plumbers/steam fitters	2,320	2,960	56
Mechanical Engineers (including technicians)	1,150	1,190	N/A
Electrical and Electronic Engineers (including technicians)	5,020	7,010	N/A
Insulation Workers	310	380	10
Millwrights	280	250	15
Sheet Metal Workers	1,980	2,900	10
Architects and Surveyors (including surveyor technicians)	1,340	1,640	N/A
Supervisors (Construction)	2,400	3,260	N/A

Source:ROSEVILLE 2003a.

* The labor pool here includes Sacramento County, the Golden Sierra Consortium, and the North Central Consortium. No data are available from the Roseville Energy Park AFC for insulation workers and architects and surveyors (including technicians) for the North Central Consortium.

Placer County has a fairly large workforce of 144,000 for California as of January 2004 (State of California 2004). The peak construction activity for the REP project represents less than 1 percent of the Placer County January 2004 workforce.

The Impact Analysis For Planning (IMPLAN) model (an input-output model), used by the applicant to estimate employment impacts from the REP project on the study area, is widely used and acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. It is a common regional economic tool. In general, most multipliers are estimated by showing the total change divided by

the initial change. Employment multipliers refer to the total additional employment stimulated by the new economic activity. 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)[2] multipliers were used for the applicant's economic impact analysis. SAM multipliers are similar to Type II[3] multipliers because they both include the indirect and induced effects (secondary impacts). An IMPLAN SAM variety employment multiplier of 1.9 for the base case was used for construction (e.g., the 114 new construction job's income supports approximately 99 indirect and induced jobs in the regional economy for a total of 213 jobs)[4]. An IMPLAN SAM variety employment multiplier of 2.1 was used for operations indicating that the 25 direct jobs support approximately 27 indirect and induced jobs in the regional economy, resulting in a total of 52 jobs. An IMPLAN SAM variety construction income multiplier of 1.2 for the base case was used that resulted in a secondary impact of $3,204,000 and a total impact of $16,467,000. Finally, an IMPLAN SAM variety operation income multiplier of 1.3 was used that resulted in a secondary impact of $1,111,000 and a total impact of $5,111,000 (CH2MHill 2004h).[5]These multipliers are within an acceptable range of 2 to 2.5 over the long run often cited by many economists (Moss et al. 1994). Therefore, staff considers these projected beneficial economic impacts to be reasonable.

Project construction (power generation including the natural gas pipeline, recycled wastewater pipeline, and electric power transmission) is expected to occur over a 19 month period. The greatest number of construction workers (peak), estimated to be 206 workers will be needed in the 11th and 12th month of construction. The number of construction workers will range from 50 in the first few and last few months of construction to approximately 206 workers in the 11 and 12th month of construction. These workers will come mainly from the local area.

The preliminary unemployment rate for Placer County was 5.0 percent in January 2004, not seasonally adjusted. This is close to full employment. For California, the unemployment rate was 6.7 percent (State of California 2004).

Staff accepts the applicant's estimate that the non-local construction workforce (approximately 10 percent of the total construction workforce or 11) would come from weekly commuters from within the greater Sacramento area or from the Golden Sierra

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[2] Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting.

[3] 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 repercussionary effects of secondary rounds of consumer spending in addition to the direct and indirect interindustry effects (Richardson 1972). Both multipliers can be of an income or employment type.

[4] Based on $13.26 million in local construction expenditures.

[5] All project construction and operations economic estimates are presented in 2006 and 2003 dollars respectively (CH2MHill 20004i and j). Staff's expert opinion is that this will have a minor impact on the secondary economic impact estimates' accuracy since only a few years are involved (three) and inflation is expected to be relatively low in the United States e.g., 2.5 percent in 2004 and 2.2 percent in 2005 (The Economist 2004).

Consortium or North Central Coast (ROSEVILLE 2003b). It is unlikely that the workers would bring their families due to the seasonal nature of the work.

During operation of the project, about 25 workers will be needed to maintain and operate the project. Most of the 25 operational workers are expected to come from Placer County, with most of the rest coming from the greater Sacramento area. Staff agrees with the applicant that a small increase in employment will have little effect on employment rates.

POPULATION

The 2000 U.S. Census shows California with a total population of 33,871,648, minority population of 18,054,858 (53.3 percent), and a white (non-Hispanic) population of 15,816,790 or (46.7 percent). For Placer County, 2000 Census shows a total population of 248,399, minority 41,163 (16.6 percent), and a white population of (non-Hispanic) 207,231 or 83.4 percent. The population of Roseville was 79,924 in 2000, minority 16,184 (20.2 percent), and a white population of 63,737 (79.8 percent). By 2010, California will grow to 40,262,400, Placer County 336,805, and the City of Roseville 110,793 (ROSEVILLE 2003a). As mentioned under the **Employment** section, the majority of construction and operation labor will be local so there would be little induced population growth from the REP project. During construction, individual work assignments typically last from several days to weeks which suggest there will be no permanent relocation of construction workers. Furthermore, there would be no displacement of population by the REP project.

HOUSING

According to federal standards, permanent housing is considered to be in short supply if the vacancy rate is less than five percent (URS 2000). As of January 1, 2000, there were approximately 107,302 housing units in Placer County and an additional 31,925 housing units in the City of Roseville (see Table 8.10-2 of the AFC). The vacancy rate for this housing averages approximately 13 percent for Placer County and 3.6 percent for the City of Roseville. There are about nine hotels/motels with 1,112 rooms in the City of Roseville with an average vacancy rate of 11 percent (ROSEVILLE 2003b). The housing units available to non-local construction workers for this project are sufficient for worker needs. The majority of the construction workforce, and most of the operations work force, is expected to be drawn from the local labor force. Also, non-local construction workers typically stay in hotel/motels.

The REP project will not result in the displacement of housing.

FISCAL

The REP project capital costs are from $100 to $130 million. The estimated value of materials and supplies that will be purchased locally (within Placer County) during construction is between $1.5 and $3 million. Sales tax is paid on material and supply expenditures. The sales tax rate of 7.25 percent in Placer County is comprised of the state sales tax rate (six percent), one percent to the place of sale, 0.25 percent to the county and 0.125 percent to special districts. The total sales tax estimated during construction is between $109,000 and $218,000.

The construction payroll is $30 million. The total payroll for the operation phase is estimated to be $1.45 million annually. In addition, there are local expenditures of $450,000 per year on materials and supplies during operation. The estimated annual sales tax during operation at 7.25 percent times the cost of purchasing locally purchased materials would be approximately $32,625 (ROSEVILLE 2003b). RE, as municipal utility, is a public agency and exempt from property taxes and school impact fees under California Revenue and Taxation Code 202(a)(4) and Government Code 65995(d).

SCHOOLS

There are three public elementary school districts (22 elementary schools) and one high school district within the City of Roseville. Overall, four unified school districts operate in the City of Roseville and other areas.

The average pupil-teacher ratio for all schools within the City of Roseville was 20.8:1 during the 2002-2003 school year. This ratio was similar to the Placer County and California pupil-teacher ratios, which were 20.5:1 and 20.7:1 respectively (California Department of Education 2003). Overcrowding does not appear to exist in the City of Roseville schools.

Staff agrees with the applicant that most non-local construction workers (10 percent or 21 workers for the peak and 11 workers for the average) will probably not bring their families for the 19-month project. During the operations phase, even if all of the 25 operating employees were to relocate and live in Roseville, which is not likely to be the case, it would not result in a significant adverse impact. Assuming an average family size (two parents) of 3.14 (US Census 2000) about 29 children would be added to the local schools. This would result in a less than one-percent increase in enrollment for the base year of 2002-2003 for the City of Roseville. Overall, staff expects no significant impact on study area schools.

POLICE PROTECTION

The AFC (Section 8.10.1.5 Law Enforcement) notes that the proposed REP project will be served by the Roseville Police Department. The Roseville Department has 95 sworn officers and 68.5 support personnel. The response time to an emergency at the proposed project site is approximately five to six minutes (CEC 2004a). The Placer County Sheriff's office also provides law enforcement in the City of Roseville.
The REP project would not significantly increase the existing demand for police service or adversely affect police protection in and around the REP project area (CEC 2004a). There would be a small increase in population during the 19 months of construction and during operation, but most of the workforce will be local (ROSEVILLE 2003a).

MEDICAL SERVICES/UTILITIES

In the AFC (Section 8.10.1.5 Public Services), medical services are discussed. The Sutter Roseville Medical Center in Roseville is the closest medical facility to the proposed site. It is approximately 9 miles from the REP project with a response time of approximately 20 minutes. The Sutter Roseville Medical Center has 172 licensed beds and more than 400 staff physicians. It is the only trauma center between Sacramento and Reno and operates a 24-hour emergency department.

Water and wastewater discharge is discussed in a separate Preliminary Staff Assessment (PSA) section entitled **Soil and Water Resources**. The REP project will connect to RE's electrical transmission lines and PG&E will deliver natural gas. Adequate supplies of electricity are available for REP's construction, and gas is available for REP's operation (CEC 2003a) which is discussed in the PSA **Reliability** section. Fire protection is discussed in the PSA section entitled **Worker Safety and Fire Protection**. Solid waste removal is discussed in the PSA section entitled **Waste Management**.

Finally, the REP project will not directly or indirectly induce substantial population growth. Hence, there are no significant socioeconomic impacts that might trigger adverse physical impacts in the provision of public services

CUMULATIVE IMPACTS

Cumulative impacts might 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, resulting in an influx of non-local workers and their dependents.

A major mixed-use planned development, referred to as the West Roseville Specific Plan (WRSP), is close to the REP project and will impact over 3,000 acres. Economic conditions will influence the pace of economic development for the WRSP. The REP project will start up in mid-2005 (estimated for July) so there is some potential overlap. The skills set for these projects differ, with the WRSP, a residential/commercial development, and the REP an industrial facility. The WRSP will involve less demand for pipe fitters, electricians, boilermakers, iron workers, laborers, millwrights and carpenters than REP. However WRSP would involve demand for electricians and carpenters.

There is another power plant being constructed within the REP project area. This is the Sacramento Municipal Utility Cosumnes Power Plant (CPP). Phase 1 of CPP began 24 months of construction in October 2003. Again, REP construction will be for 19 months (approximately 18-20 months) beginning in mid-2005.

Table 2 shows expected workforce requirements with nine overlapping months. Work on CPP (Phase 1) looks to be coming to a close as work begins on the REP project. Also, the projects are 34 miles apart at opposite ends of the Sacramento metropolitan area, hence drawing on somewhat different labor pools. Overall, this should diminish the competition for power plant work force (ROSEVILLE 2003b).

Table 2 Construction Workforce for CPP (Phase 1) and REP Showing Overlap

Months of Overlap	7/05	8/05	9/05
Cosumnes (Phase I) Construction Month	22	23	24

(started in 2003)			
CPP (Phase I) Total Construction Workforce	80	28	18
REP Construction Month	7	8	9
REP Total Construction Workforce	50	50	50
CPP and REP Total Construction Workforce	130	78	68

Source: ROSEVILLE 2003b and G&B 2004c.

Finally, because the REP project would not result in any significant adverse socioeconomic impacts to population, housing, or public services due to the small size and temporary nature of construction, it is unlikely that it would contribute significantly to cumulative socioeconomic impacts. Staff concludes that there are no significant adverse cumulative socioeconomic impacts.

MINORITY AND LOW-INCOME POPULATIONS (ENVIRONMENTAL JUSTICE SCREENING ANALYSIS)

The purpose of the 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 [the Environmental Protection Agencies'] EPA's [National Environmental Policy Act] NEPA Compliance Analysis," Guidance Document (EPA 1998). Minority 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; or
- one or more census blocks in the affected area have a minority population greater than fifty percent.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

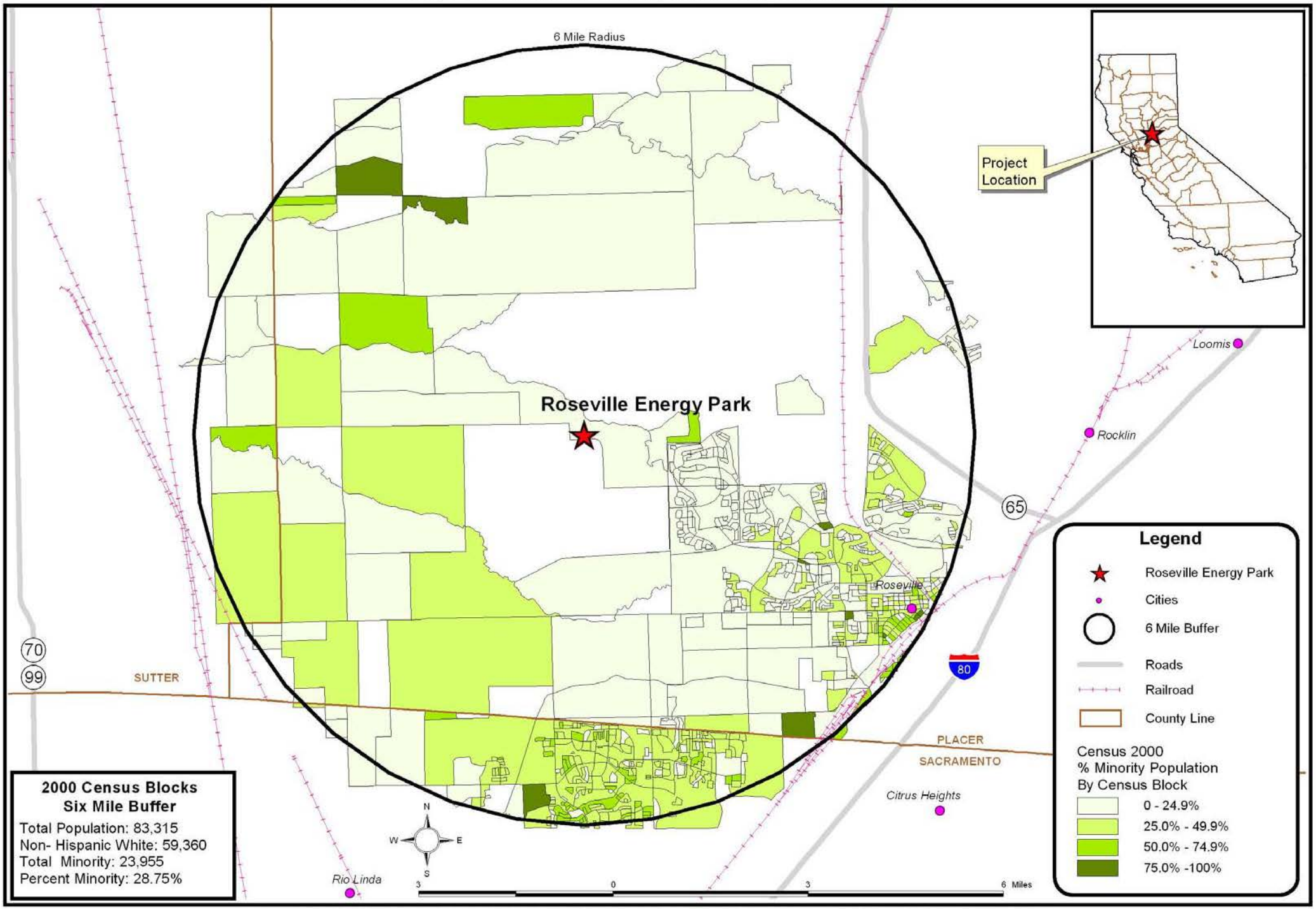
Staff has reviewed Census 2000 information that shows minority population by census block is 28.75 percent, which is less than staff's threshold of fifty percent within a six-mile radius of the proposed REP project (See **Socioeconomics Figure 1**). But, there are pockets (census blocks) with greater than 50 percent minority population. Census 2000 by census block group information shows that the low-income population is 5.22 percent within the same radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Based on this socioeconomic analysis, staff has not identified significant direct or cumulative, adverse socioeconomic impacts resulting from the construction or operation of the project. The REP project is proposed to be built in an urban area, will not physically alter the community, and will largely utilize a local labor force that will not create any new significant demands on community infrastructure and services. Therefore, there are no socioeconomic environmental justice issues related to this project.

For a listing of other technical sections that include an EJ analysis, please refer to the **Introduction** section of this document. For a summary of environmental justice impacts regarding these other sections, please see the **Executive Summary**.

SOCIOECONOMICS - FIGURE 1

Roseville Energy Park - Census 2000 Minority Population by Census Block - Six Mile Buffer

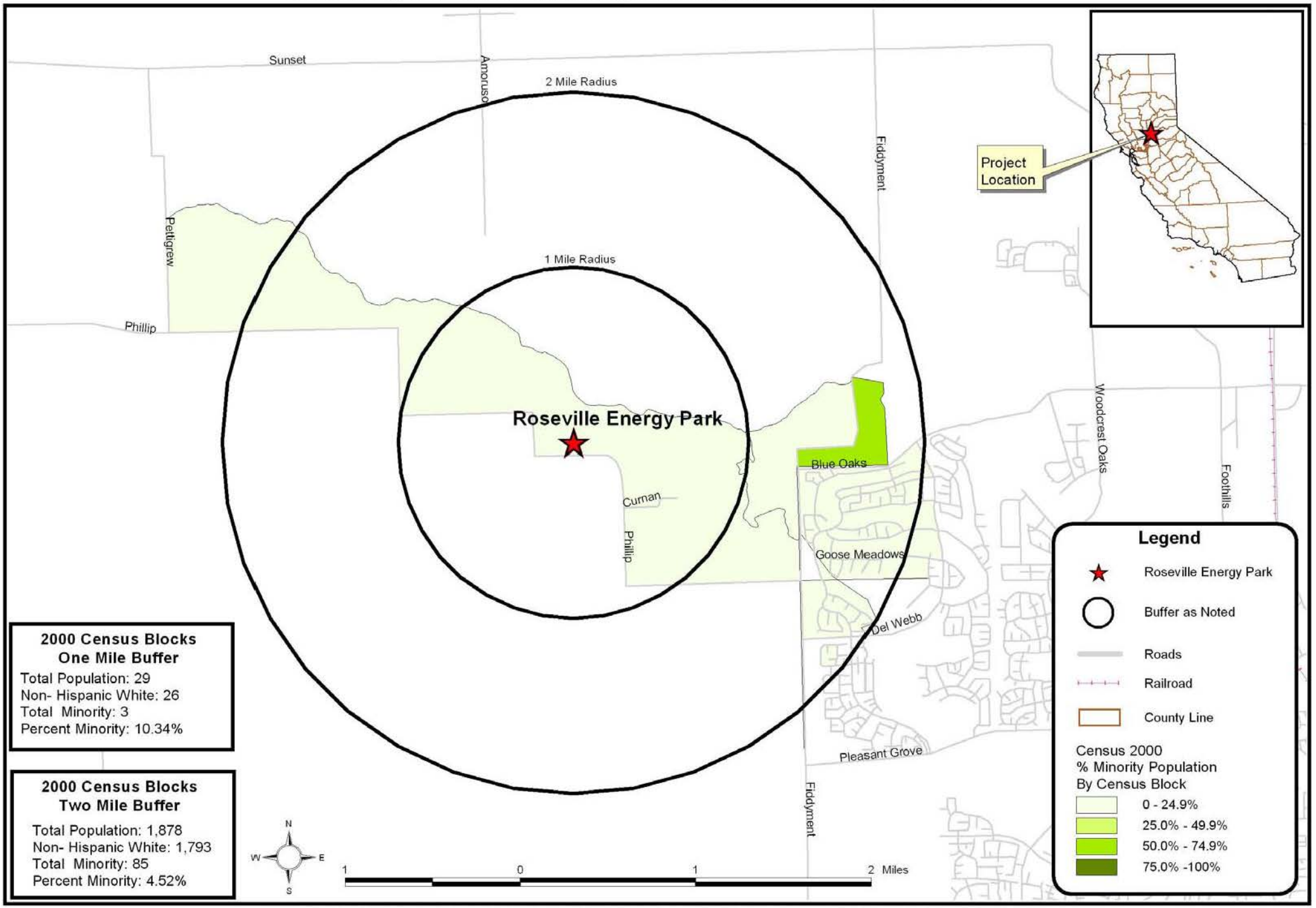


CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2003, Census 2000 PL 94-171 Data - Matrix PL2

SOCIOECONOMICS - FIGURE 2

Roseville Energy Park - Census 2000 Minority Population by Census Block - One and Two Mile Buffer

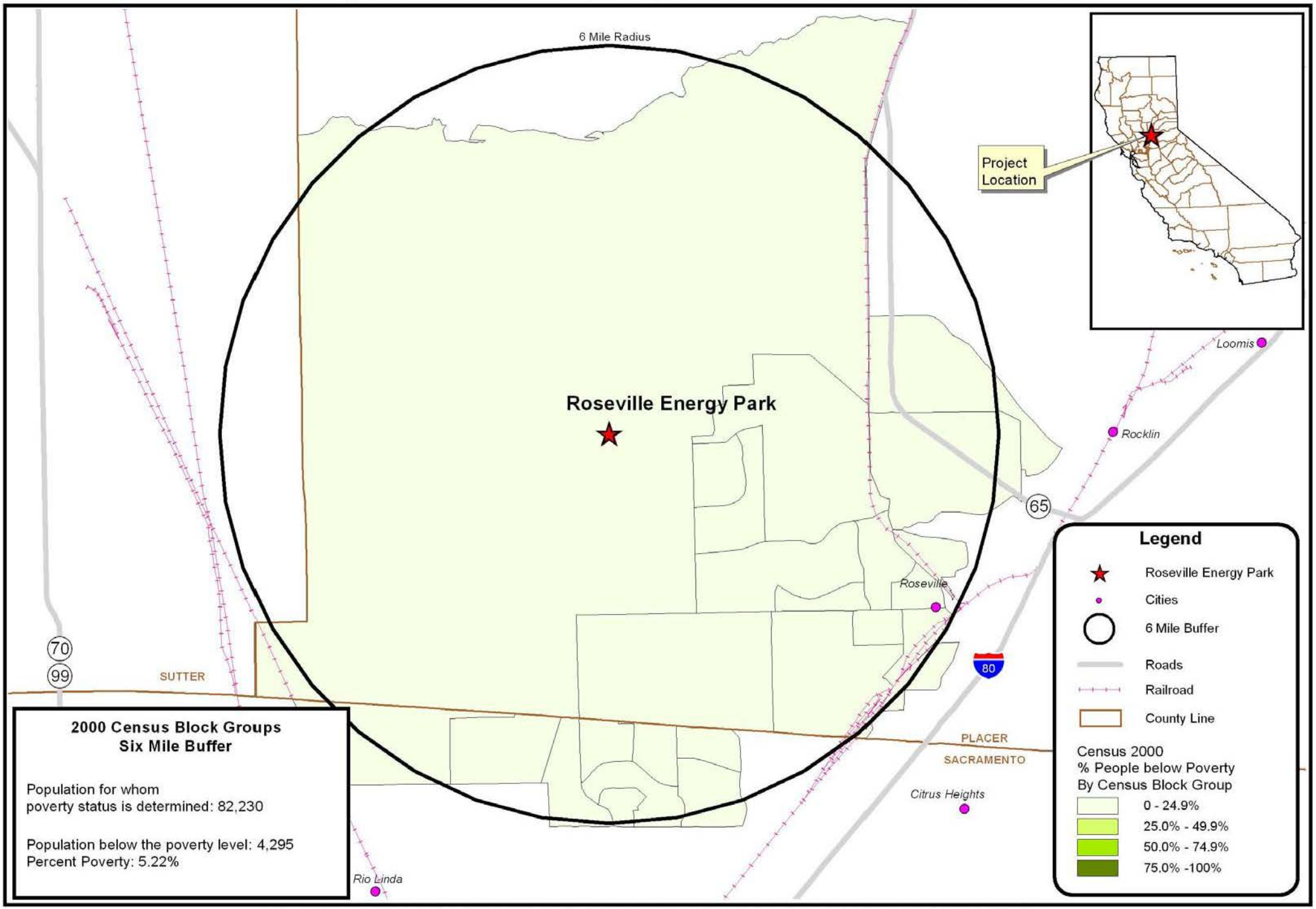


CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2003, Census 2000 PL 94-171 Data - Matrix PL2

SOCIOECONOMICS - FIGURE 3

Roseville Energy Park - Census 2000 Percentage of People below Poverty by Census Block Group - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2003, Census 2000 SF3

FACILITY CLOSURE

The REP AFC did not include in socioeconomics Laws, Ordinances, Regulations and Standards (LORS) that will be incorporated into the facility closure plan when it becomes necessary at the end of the project's economic life. The socioeconomic impacts of facility closure will be evaluated at that time. The planned lifetime of the proposed power plant is 30 years.

Any unexpected, temporary closure would not likely cause any significant environmental impacts on the affected area, because the likely result of a temporary closure would be reactivation of the power plant by the same or a new owner within a relative short period of time. Personnel changes may occur if there is an ownership change, but socioeconomic impacts would not change significantly because the number of operation personnel would remain relatively the same.

Any unexpected, permanent closure of the REP would not likely cause any significant adverse socioeconomic impacts on the affected area, because facility closure impacts (i.e., dismantling) would be similar to construction impacts, and staff has found no significant adverse socioeconomic impacts due to the construction of the project. However, a facility closure plan would be analyzed to determine if there would be any socioeconomic impacts.

MITIGATION

Since staff has not identified any significant adverse socioeconomic impacts, no mitigation measures are proposed.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

There are estimated gross benefits from the REP project which include increases in sales taxes, employment, and income for Placer and Sacramento Counties. For example, there are estimated to be 114 direct project-related construction jobs for 18-20 months of construction, resulting in 213 total jobs that will be created, of which 99 are secondary (indirect and induced) jobs. Secondary construction income impacts are estimated at $3,204,000 with the total $16,467,000. For operations, 25 direct jobs will be created with 27 secondary (indirect and induced) jobs for a total of 52 jobs. Secondary operation income impacts are estimated at $1,111,000 with a total of $5,111,000. The total sales tax during construction is estimated to be $109,000 to $218,000.

Staff finds that the REP project will not cause a significant adverse socioeconomic impact on the study area's housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population and low-income population within six miles of the proposed power plant site is less than 50 percent, but there are individual census blocks with greater than 50 percent minority population. Staff finds that there would be no significant adverse socioeconomic impacts

since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues.

The REP project, as proposed, is consistent with the applicable socioeconomic LORS.

RECOMMENDATIONS

Staff does not propose any socioeconomic conditions of certification.

Socioeconomics Table 3 provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the REP project.

SOCIOECONOMIC DATA AND INFORMATION - TABLE 3[6]	
Project Capital Costs	$100-$130 million
Estimate of Locally Purchased Materials	
Construction	$1.5-$3 million
Operation	$450,000 per year
Estimated Annual Property Taxes	Not applicable. Roseville Electric (RE) is exempt.
Estimated School Impact Fees	Not applicable. RE is exempt.
Direct Employment	
Construction (average)	114 jobs
Operation	25 jobs
Secondary Employment	
Construction	99 jobs
Operation	27 jobs
Direct Income	
Construction	$13,263,000
Operation	$4,000,000
Secondary Income	
Construction	$3,204,000
Operation	$1,111,000
Payroll	
Construction	Total-$30 million.
Operation	Average: $1.45 million annually.
Estimated Sales Taxes	
Construction	$109,000 to $218,000
Operation	$32,625 annually.
Existing /Projected Unemployment Rates	Existing – 5 percent in January 2004 (preliminary), not seasonally adjusted for Placer County and 6.7 percent in January 2004 (preliminary), not seasonally adjusted for California. Projected - Not available.
Percent Minority Population (6 mile radius)	28.75 percent
Percent Poverty Population (6 mile radius)	5.22 percent

[6] Table 3 uses 2003 dollars for operations and 2006 dollars for construction. See footnote 5 for a complete discussion. Construction is for 19 months, and project life planned for 30 years. Economic (non-fiscal and fiscal) impacts, unemployment, and population information are generally for Placer County. However, the results of IMPLAN/Input-Output modeling are for Placer and Sacramento Counties and show secondary, indirect and induced impacts, as well as direct impacts.

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SOIL & WATER RESOURCES

Testimony of Richard Latteri

INTRODUCTION

This section analyzes the potential effects on soil and water resources by the Roseville Energy Park (REP) as proposed by Roseville Electric (RE or applicant). The analysis specifically focuses on the potential for REP to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood conditions in the vicinity of the project;
- adversely affect surface or groundwater supplies;
- degrade surface or groundwater quality; and
- comply with all applicable laws, ordinances, regulations and standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.) was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCBs).

Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the RWQCB. Section 401 of the CWA applies to both the REP site and the stream crossings during pipeline construction. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (ACOE) to regulate the discharge of dredged or fill material to the waters of the U.S. and adjacent wetlands. The ACOE issues site specific or general (Nationwide) permits for such discharges.

STATE

Porter Cologne Water Quality Control Act

The Porter Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures. Water quality criteria for the project area are contained in the Water Quality Control Plan, Fourth Edition, for the Sacramento River and San Joaquin river Basins. This plan sets numerical and/or narrative water quality standards controlling the discharge of wastes to the state's waters and land. Those standards are applied to the proposed project through the Waste Discharge Requirements permit.

California Water Code

Water Code section 13550 requires the use of reclaimed water where available, as determined by the SWRCB. The availability of reclaimed water is based upon a number of criteria, which include provisions that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and will not impact downstream users or biological resources.

Section 13551 of the Water Code prohibits the use of "…water from any source of quality suitable for potable domestic use for nonpotable uses, including …industrial… uses, if suitable reclaimed water is available…" given conditions set forth in Section 13550. Those conditions take into account the quality and cost of the water, the potential for public health impacts and the effects on downstream water rights, beneficial uses and biological resources.

Section 13552.6 of the Water Code specifically identifies that the use of potable domestic water for cooling towers, if suitable reclaimed water is available, is an unreasonable use of water. The availability of reclaimed water is based upon a number of criteria that must be taken into account by the SWRCB. Those criteria are that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, and the use is not detrimental to public health, will not impact downstream users or biological resources, and will not degrade water quality.

Section 13552.8 of the Water Code states that any public agency may require the use of reclaimed water in cooling towers if certain criteria are met, as determined by the SWRCB. Those criteria include that reclaimed water is available and meets the requirements set forth in section 13550; the use does not adversely affect any existing water right; and if there is public exposure to cooling tower mist using reclaimed water, appropriate mitigation or control is necessary.

Recycling Act of 1991

The California Legislature's Water Recycling Act of 1991 (Water Code § 13575 et seq.) makes several findings and declarations regarding California's water resources and the need to develop reliable water sources. The Act encourages the use of recycled water

for certain uses and established standards for the development and implementation of recycled water programs.

California Code of Regulations

Under Title 22 of the California Code of Regulations, the California Department of Health Services (DHS) reviews and approves wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of reclaimed water for industrial processes such as steam production and cooling water.

Title 17 of the California Code of Regulations addresses the requirements for backflow prevention and cross connections of potable and nonpotable water lines.

The California Safe Drinking Water and Toxic Enforcement Act

This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The requirements of the Act are administered by the RWCQB.

STATE POLICIES

State Water Resources Control Board

The SWRCB has adopted policies that provide guidelines for water quality protection. The principal policy of the SWRCB that specifically addresses the siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted as Resolution 75-58 on June 19, 1975). This policy states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.

State Water Resources Control Board Resolution 77-1 encourages and promotes reclaimed water use for nonpotable purposes.

LOCAL

City of Roseville Municipal Code & Conditions of Approval

Section 14.17 – Recycle Water Policy requires recycled water to be used in a manner that is in compliance with all LORS and in lieu of potable water where feasible.

Appendix A, Standard Conditions of Approval -- Major Project Permit, Roseville Energy Project.

ENVIRONMENTAL SETTING

SITE AND VICINITY DESCRIPTION

The proposed REP site is located approximately six miles from the center of the City of Roseville, Placer County, California. The City of Roseville is located at the southern

edge of Placer County and is bounded on the north and west by unincorporated lands, on the south by Sacramento County, and on the east by the unincorporated community of Granite Bay. The City of Sacramento is located approximately 16 miles southwest of the REP site (Roseville 2004a, Biological Assessment, pg 1).

The climate in the project area is mediterranean with hot, dry summers and mild, wet winters. Monthly average temperatures range from 40.5°F to 94.7°F. Temperatures exceeding 90°F occur on average 87 days per year and temperatures below 32°F occur on average three days per year. From 1993 through 2002, annual precipitation for the City of Sacramento ranged from 11.82 inches (1999) to 28.90 inches (1998), with a 10 year average annual precipitation of 21.1 inches (Roseville 2003a, Section 8.15.1.1).

The REP is situated on a 40 acre City of Roseville parcel within the Pleasant Grove and Kaseberg creek watersheds. The project site is located on a gently rolling, low gradient alluvial fan with an average elevation of approximately 92 feet above mean sea level (msl) and an average grade of about five percent. The REP power plant site is bordered on the north by private property and Pleasant Grove Creek; on the east by an open parcel belonging to the City of Roseville; on the west by private property; on the south by Phillip Road and the Pleasant Grove Waste Water Treatment Plant (PGWWTP) (Roseville 2004a, Biological Assessment, pg 1).

SOILS

The 40 acre City owned parcel and surrounding areas consist of a wide variety of soil types ranging in texture from silty clays to silty sands that are derived from older fan deposits of the Quaternary Riverbank and Turlock Lake formations

The REP construction area, which includes the power plant site, recycled water pipeline, sanitary wastewater pipeline, and stormwater outfall, is situated entirely within the Cometa Ramona sandy loam soil series. The Cometa Ramona sandy loam soil has a permeability that is moderately slow to very slow and is well drained, with a slight erosion hazard.

The proposed natural gas pipeline crosses several soil series; the most prominent being the Fiddyment Cometa Kaseberg and the Cometa Ramona series. The soils within those series are mostly deep and well drained that have formed on terraces. The depths, permeability, erosion potential, and shrink swell behavior of the soil types associated with all REP facilities are listed in Table 8.11-1 of the Application for Certification (AFC) and their locations identified on Figure 8.11-1 of the AFC (Roseville 2003a, Section 8.11.1).

SURFACE WATER

The REP site lies within the North American Subbasin where the principal drainages are the Sacramento, American, Feather, and Bear Rivers. The 70 acre City owned parcel, which includes the REP site, is situated within the Pleasant Grove and Kaseberg Creek watersheds with the REP site located 0.25 mile south of Pleasant Grove Creek. Smaller creeks and tributaries to Pleasant Grove Creek are situated to the east of the project site, with the closest being the unnamed tributary of Pleasant Grove Creek lying approximately 700 feet to the east of the REP site.

Pleasant Grove Creek drains from the Sierra Nevada foothills approximately 1.5 miles north of Rocklin into the Natomas Main Drainage Canal. From the Natomas Main Drainage Canal, water from Pleasant Grove Creek eventually enters the Sacramento River about 15 miles downstream from the project site. Two other main tributaries to Pleasant Grove Creek, Kaseberg Creek and South Branch Pleasant Grove Creek, are located approximately two miles east of the REP site (CH2MHill 2004b, Section 2.4).

GROUNDWATER

The project site is situated within the North American Subbasin of the Sacramento Valley Groundwater Basin. The North American Subbasin is approximately 30 miles long and 25 miles wide with a surface area of approximately 548 square miles. The subbasin contains both an upper and lower aquifer system with most of the groundwater produced in the northern portion of the subbasin. The REP is located within the interior portion of the subbasin with a groundwater level at 108.5 feet below ground.

Recharge to the aquifers comes almost exclusively from Sierra Nevada runoff with the greatest percentage of recharge coming from the northern Sacramento Valley. No artificial recharge is known to occur within the subbasin. However, the City of Roseville is evaluating a feasibility study for aquifer storage and recovery where surface water would be injected into the aquifer during wet years for storage and then pumped out during dry years (Roseville 2003a, Section 8.15.1.2).

PROJECT WATER SOURCES

Water Supply

The City of Roseville obtains 99 percent of its water supply from Folsom Lake with the remaining one percent from recycled water generated by the City's existing Dry Creek Waste Water Treatment Plant (DCWWTP). The City uses groundwater for short term backup supply during dry years and has four wells capable of producing a combined output of 6,600 acre feet per year (AFY).

The project's cooling water and process makeup water will be supplied entirely by tertiary treated recycled water from the adjacent PGWWTP via a pipeline that crosses Phillip Road. Recycled water will also be used on-site for fire suppression and landscape irrigation. The total availability of recycled water from the PGWWTP in 2005 is estimated to be 6.5 million gallons per day (mgd) with the maximum REP demand projected to be 1.71 mgd.

The REP site will use groundwater from an on-site well for potable and domestic uses. The City has tested one of the three existing wells on the City owned parcel and determined that its quality and pressure are sufficient to serve the project. The anticipated REP demand for groundwater from the onsite well is estimated to be approximately 0.5 gallons per minute (gpm) or less than 1 AFY.

The PGWWTP went into operation on June 22, 2004, and officially began discharging 2 mgd of tertiary treated recycled water to Pleasant Grove Creek on June 29, 2004 (email from Andrea Grenier to Bob Eller, July 13, 2004). Water quality parameters for the

PGWWTP are not yet available. In the absence of the PGWWTP data, the water quality parameters from the City's DCWWTP and on-site wells are shown on **Soil and Water Resources Table 1**. The recycled water from the PGWWTP is expected to be similar to the water from the DCWWTP (Roseville 2003a, Section 8.15.2.2).

Soil and Water Resources Table 1
Expected PGWWTP Reclaimed Water & Groundwater Quality

Water Quality Parameter[a]	***PGWWTP***[b]	***On-site Well***[c]	***Drinking Wtr Standard***[d,e]
General Parameters			
Alkalinity, Total (mg/L)	60	101	None
Bicarbonate (mg/L)	N/T	N/T	None
Hardness (as $CaCO_3$) (mg/L)	107.5	109	200
Nitrate (as NO_3) (mg/L)	6.5	1	45[c]
pH	6.9	8.0	6.0 – 9.0
Total Dissolved Solids (mg/L)	398.5	250	1,000[d]
Chemical Parameters			
Arsenic (μg/L)	<1.0	5.1	50[c]
Boron (mg/L)	267.5	0.17	None
Cadmium (μg/L)	<0.2	N/T	5[c]
Calcium (mg/L)	40.2	19	None
Chloride (mg/L)	103.5	34	500[d]
Chromium, Total (μg/L)	1.2	7.5	50[c]
Copper (μg/L)	4.9	N/T	1,000[d]
Fluoride (mg/L)	1.25	0.21	1.8[c]
Lead (μg/L)	<1	N/T	Action Level=15
Magnesium (mg/L)	4.45	15	None
Manganese (mg/L)	0.054	N/T	2[c]
Nickel (μg/L)	2.3	N/T	100[c]
Potassium (mg/L)	12	1.3	None
Silver (μg/L)	0.014	N/T	100[c]
Sodium (mg/L)	75	24	None
Sulfate (mg/L)	37	7.1	500[d]
Zinc (μg/L)	46	N/T	5000[d]

[a] For common inorganic water quality constituents
[b] Based on quality of recycled water from the City's Dry Creek Waste Water Treatment Plant
[c] Source: MWH Laboratories, 2003.
[d] Maximum contaminant level as specified in Table 64431 A of Section 64431, Title 22, of the CCR.
[e] Secondary maximum contaminant level as specified in Table 64449 B of Section 64449, Title 22, of the CCR.
mg/L = milligrams per liter
μg/L = micrograms per liter
<MDL = below method detection limit
N/T = Not tested by City

Roseville 2003a, Table 8.15 3

PROJECT DESCRIPTION

The REP consists of a proposed natural gas fired combined-cycle power plant and associated natural gas, reclaimed water supply, and sanitary wastewater pipelines. Major components of the plant include two combustion turbine generators (CTGs), one

steam turbine generator (STG), two heat recovery steam generators (HRSGs), a mechanical draft wet cooling tower, a zero liquid discharge (ZLD) system, and a new 60 kilo Volt (kV) switchyard. The switchyard will connect with the future 60 kV double circuit transmission line that will be located adjacent to the REP switchyard on Phillip Road. No new transmission lines will be required.

The REP is situated within a 40 acre City of Roseville parcel. The fenced power plant and switchyard will encompass approximately 8.9 acres. An additional 7.14 acres of the City owned parcel will be used for construction offices and parking. The construction laydown area will be located immediately west of the PGWWTP on a 16.5 acre undeveloped parcel that is part of the West Roseville Specific Plan (WRSP). The total project construction site will encompass 35.64 acres. Access to the plant and the construction laydown area will be from the existing Phillip Road that runs between the REP and the PGWWTP (Roseville 2004a, Biological Assessment, pg 1).

Natural gas will be delivered to the site by Pacific Gas & Electric Company (PG&E) from a gas distribution line located approximately six miles southeast from the REP site. For cooling tower makeup, fire protection, process makeup, and service water, a 50-foot long pipeline will supply tertiary treated recycled water from the PGWWTP. Sanitary wastewater will be piped to the PGWWTP's influent junction structure located approximately 800 feet east of the project site. Potable water for domestic purposes will be provided from an on-site well (CH2MHill 2004b).

PROJECT RELATED IMPACTS

DIRECT AND INDIRECT IMPACTS

SOIL

Erosion Control and Stormwater Management

Power Plant Construction and Operation

The general site grading of the REP site will establish a working construction surface and provide positive drainage for site buildings and structures. Earthwork at the site will consist of excavation for foundations, underground pipe and utility trenches, and two hydraulically connected stormwater detention ponds.

During the early phases of construction, temporary erosion and sediment control measures will direct stormwater runoff to the natural runoff swale at the northeastern end of the site. After final site grading and construction of the stormwater detention ponds, stormwater runoff will be directed to the detention ponds. The detention ponds will be constructed for sediment and contamination control and will be designed to release on-site stormwater runoff to the unnamed tributary of Pleasant Grove Creek that lies approximately 700 feet east of the REP site (CH2MHill 2004b).

Subsequent soil disturbances during construction are expected to result in short term increases in water and wind erosion. RE is required, under Section 402 of the Clean Water Act, to comply with the statewide NPDES permit for stormwater discharges associated with construction and industrial activities. Project design, the Storm Water Pollution Prevention Plans (SWPPP), and the Erosion and Sediment Control Plan (ESCP) will include measures to control stormwater pollution, erosion and other forms of soil degradation.

RE is required under Conditions of Certification **SOIL & WATER 1 & 2** to obtain a NPDES permit for construction activities and to prepare both a construction SWPPP and an ESCP prior to starting construction activities. Once construction of the REP is complete, RE is required under Conditions of Certification **SOIL & WATER 3** to prepare an industrial SWPPP for operation of the REP. No significant impacts are expected if Conditions of Certification **SOIL & WATER 1, 2 & 3** are implemented.

Natural Gas Pipeline

The natural gas pipeline will be a 10 to 16 inch diameter pipe that will be constructed from the REP site to the existing PG&E gas connection point along Baseline Road. PG&E will construct the natural gas pipeline using trench excavation, jack and bore, or horizontal directional drilling (HDD) for the approximately six mile long pipeline. The route will cross several major waterways including four crossings of Kaseberg Creek and one crossing of Curry Creek (Roseville 2004a).

Construction impacts will include soil disturbance associated with trenching and jack and bore construction with the potential to cause accelerated soil erosion from wind or water. If HDD is used at Kaseberg or Curry creeks, it will involve drilling from the ground surface adjacent to the creek using a technique that guides the direction of the drill to pass under the creek and emerge on the ground surface on the opposite side without disturbing the creek bed. Staging areas are required at the entry and exit points of the drill.

HDD is used to avoid disturbance of water courses and wet areas. There are, however, potential water quality impacts associated with HDD. Those potential impacts include occasional unintended fracturing (frac-outs) of the ground above the drill resulting in a pathway through which drilling mud discharges onto the ground surface or streambed. Although not generally toxic, the drilling mud can cause turbidity impacts or coat streambed surfaces to the detriment of aquatic life. Frac-outs can sometimes be difficult to detect, particularly in streams with flowing water.

Trenching for pipeline installation and vehicular travel within the construction corridor will temporarily disturb soils and potentially increase wind and water erosion. However, appropriate erosion and fugitive dust control measures would be implemented during construction. A California Department of Fish and Game 1601 Streambed Alteration Agreement will be needed prior to crossing Kaseberg and Curry creeks. Depending on the construction method used, an ACOE Nationwide permit may also be required. PG&E will construct and own the natural gas pipeline. PG&E will be required, under Section 402 of the Clean Water Act, to comply with the statewide NPDES permit for stormwater discharges associated with construction activities and will be required to

implement temporary and permanent best management practices (BMPs) to prevent soil erosion and sediments from affecting surface water.

As the owner operator of the REP, RE is required under Conditions of Certification **SOIL & WATER 1 & 2** to provide the Compliance Project Manager (CPM) with copies of the construction activity SWPPP and ESCP for all elements of the REP. No significant impacts to soil or water resources are expected.

Sanitary Wastewater Pipeline

The sanitary wastewater pipeline will be a three to six inch diameter, 800-foot pipeline constructed from the REP site to the PGWWTP influent junction structure located east of the REP. Construction impacts will include soil disturbance associated with trenching and will have the potential to increase wind and water erosion.

The sanitary wastewater pipeline will be constructed across an unnamed tributary to Pleasant Grove Creek. Stream crossings where HDD would not be used would be crossed by open trench. Potential construction-related impacts of an open trench crossing include:

1. increased sediment delivery to the stream flow through disturbance of the channel bed and banks during construction;
2. sediment deposits to the streambed through disturbance of the channel bed and banks during construction;
3. destabilization of the channel bed and banks resulting in long-term erosion; and
4. introduction of foreign contaminants through the use of heavy machinery in the streambed.

However, appropriate erosion and fugitive dust control measures would be implemented during construction. RE has provided a draft SWPPP that identifies temporary and permanent BMPs to prevent soil erosion and sediments from affecting surface water. Other BMPs specific to trenched stream crossings include construction in the dry season, diversion of stream flows around the active excavation area through the use of coffer dams, installation of temporary culverted crossings for heavy equipment, and regular maintenance and inspection of heavy equipment used in the stream channel to minimize the introduction of foreign pollutants.

A California Department of Fish and Game 1601 Streambed Alteration Agreement will be needed prior to the creek crossing. Depending on the construction method used, an ACOE Nationwide permit may also be required. Under the NPDES permit and implementation of the SWPPP and ESCP (Conditions of Certification **SOIL & WATER 1 & 2**), no significant impacts are expected.

Pipeline Scour Potential

Natural stream channels are subject to streambed and bank scour during flood events. Bed scour is usually not visible because it occurs during a flood and ceases as the flood subsides. Bank erosion is more evident because the effects can be seen well after the flood. Pipelines buried below and adjacent to active stream channels can be uncovered

and exposed by bank erosion or streambed scour. Exposure of the pipeline could result in pipeline rupture through the action of flowing water and debris, or through third party action after the exposure has occurred. Rupture of the gas pipeline could result in water contamination or fire hazard, while rupture of the sanitary wastewater pipeline would result in surface water contamination.

The potential for exposure of the pipeline by stream erosion and scour can be minimized by locating the pipeline below the expected 100-year depth of scour at stream crossings and extending this depth of burial a sufficient distance away from the streambed to avoid anticipated lateral erosion. Condition of Certification **SOIL & WATER 9** requires an analysis (plan) prepared by a registered civil engineer that demonstrates that the proposed pipelines (natural gas and sanitary wastewater) will be below the expected 100-year depth of scour at all stream crossings.

SURFACE WATER

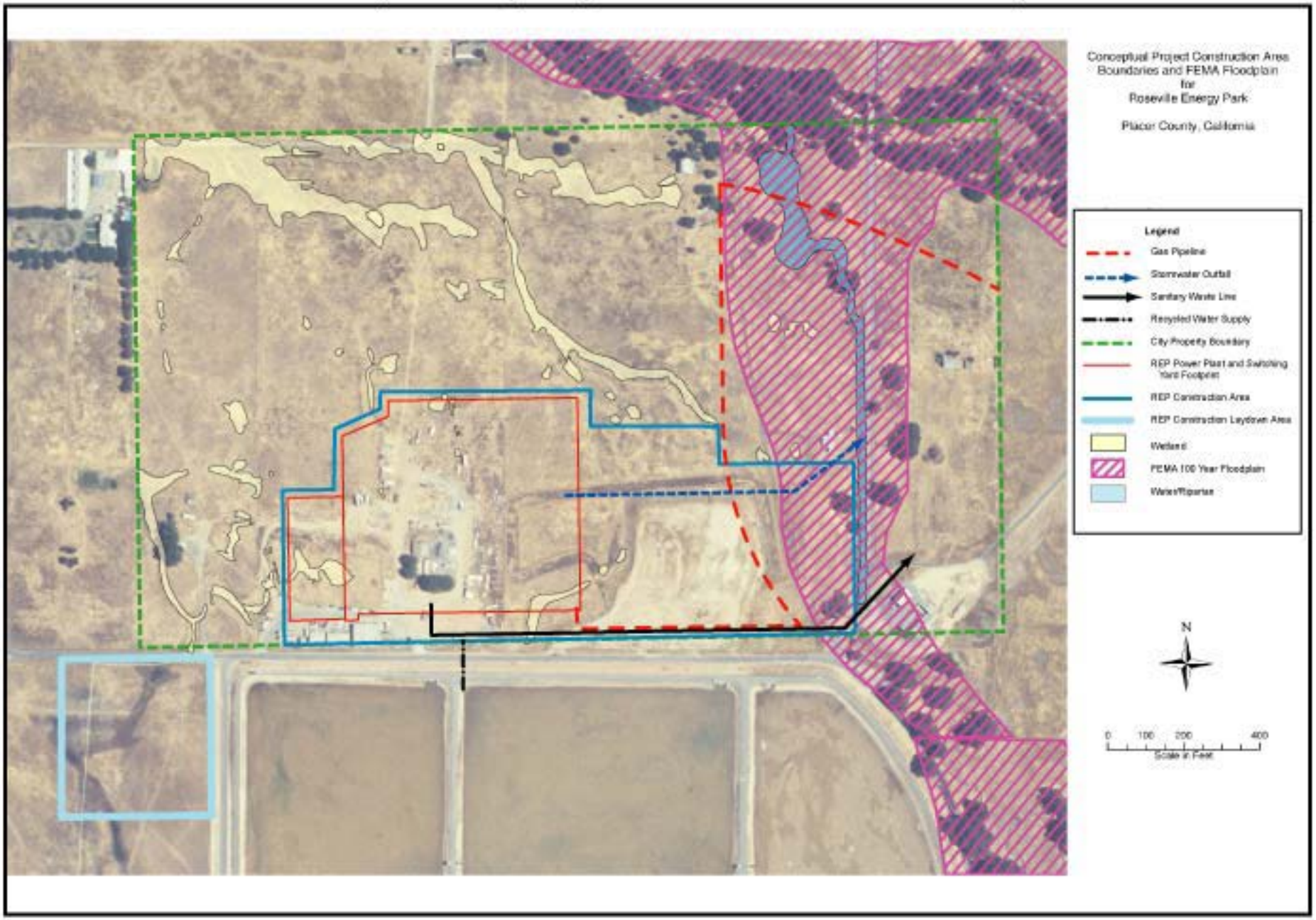
Due to the proximity of the proposed REP site to Pleasant Grove Creek (0.25 mile) and its unnamed tributary (approximately 700 feet), the potential for site flooding and surface water degradation has been evaluated. Water surface elevations for the 100-year storm are contained in the June 2003 ***Master Drainage Study for the Fiddyment and Westpark Properties*** (Wood-Roger 2003) and were evaluated for Pleasant Grove Creek in the vicinity of the REP construction area. The Fiddyment and Westpark properties make up the 3,162 acre area surrounding the REP, which will be developed as the West Roseville Specific Plan.

The purpose of the ***Master Drainage Study for the Fiddyment and Westpark Properties*** was to determine the potential drainage impacts from the build-out of the WRSP on the Pleasant Grove and Curry creek watersheds. As part of the study, the entire Pleasant Grove Creek watershed upstream of the REP was modeled using the Hydrologic Engineering Center-River Analysis System (HEC-RAS) and the results evaluated to delineate the 100-year flood plain for Pleasant Grove Creek and its tributaries. The HEC-RAS study used hydrologic modeling based on the ultimate build-out of the Fiddyment property to determine the 100-year water surface elevation in Pleasant Grove Creek and its unnamed tributary. The results of the HEC-RAS analysis were used to delineate the 100-year flood plain, which closely matches the Federal Emergency Management Agency flood elevations shown on **Soil and Water Resource Figure 1**. For the unnamed tributary east of the REP, the HEC-RAS indicates a 100-year floodwater level of 86 feet above msl at the southeast corner of the laydown area decreasing to 83 feet above msl at the confluence of Pleasant Grove Creek northeast of the laydown area.

As shown on **Soil and Water Resource Figure 1**, portions of the construction area are within the 100-year flood plain The flooding of the construction area will not result in significant impacts. The occurrence of the 100-year storm is not likely during the 18 to 20 months of plant construction. Therefore, surface water degradation from minor flooding of the construction area is not anticipated.

SOIL AND WATER RESOURCES - FIGURE 1

Roseville Energy Park - Conceptual Project Construction Area Boundaries and FEMA Floodplain



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: Figure provided by informal request during April 15, 2004 workshop & Roseveille Electric

The results of the HEC-RAS indicate a floodwater level in the unnamed tributary to be 86 feet above mean sea level (msl) at the southeast corner of the laydown area decreasing to approximately 83 feet above msl at the confluence of Pleasant Grove Creek. The final grade of the REP site will be 94 feet above msl, which is above the predicted 100-year floodplain. Within the site, plant stormwater runoff will drain to two hydraulically connected detention ponds that will be designed for gravity flow with hydraulic grade lines of 85 feet above msl for the upper pond and 81.5 feet above msl for the lower pond. With the 100-year flood level close to 83 feet above msl at the outfall location, the lower detention pond is subject to inflow from the tributary during a 100-year flood.

RE is required under Conditions of Certification **SOIL & WATER 3** to prepare an industrial SWPPP for operation of the REP. As part of the industrial SWPPP, RE will be required to have BMPs in place to prevent contaminated stormwater discharges. No significant impacts are expected if Condition of Certification **SOIL & WATER 3** is implemented.

Water Supply

The City of Roseville will provide process water for the REP from the PGWWTP. The PGWWTP will supply tertiary treated recycled water to meet cooling and process makeup requirements. Cooling and process demands include water for cooling tower evaporation, steam cycle makeup, combustion turbine generator (CTG) air inlet cooling; CTG wash water; and CTG water injection for pollution control and increased power output (GE LM6000 combustion turbine). A one million gallon, above ground storage tank will be constructed on-site to store recycled water for fire protection and provide capacity for intermittent daily peak loads. In Data Request 54, staff asked if this was the only source of backup water supply and what source of cooling water would RE use in the event PGWWTP supply is unavailable due to equipment failure or other reasons. In response to Data Request 54, RE states, "B*ecause of the reliability and redundancy inherent in the design of modern day wastewater treatment plants such as the PGWWTP, interruptions in the supply of recycled water exceeding 10 hours are expected to be extremely rare. Nonetheless, in the event there is an interruption in the supply of recycled water that causes the exhaustion of the process storage available in the service/firewater storage tank, the REP will shut down due to the lack of a back up water supply* (CH2MHill 2004a, DR 54)."

RE prepared the AFC to allow the flexibility to use either the General Electric LM6000 PC SPRINT (GE LM6000) combustion turbines or the Alstom GTX100 combustion turbines. Because the GE LM6000 will consume slightly more water than the Alstom GTX combustion turbines, recycled water consumption will be shown for the "worst case" GE LM6000 design (Roseville 2003a, Section 7.1).

Operation of the REP will require up to 1,247 acre-feet of recycled water annually based on the dispatch assumptions found in Tables 8.1-10 of the AFC. The average quarterly and annual water requirements for the GE LM6000 are shown in **Soil and Water Resources Table 2**. Through the use of recycled water for all nonpotable uses, the operation of the REP will have no impacts on fresh water resources.

Soil and Water Resources Table 2
REP Quarterly and Annual Water Requirements

GE LM6000 Turbine	*Quarter*				**Totals**
	1st	*2nd*	*3rd*	*4th*	
	Operating Profile				***Hours/Yr***
Base Load Hours	1,123	1,168	751	852	3,914
Peaking Hours (Duct Firing)	929	559	1,347	1,246	4,081
Operating Hours per Quarter	2,052	1,747	2,098	2,098	7,995
Total Hours per Quarter	2,160	2,184	2,208	2,208	8,760
	Recycled Water Demand				***Qtrly Ave***
Demand per Quarter, gpm	767	567	892	861	773
Demand per Quarter, gpd	1,104,000	816,000	1,284,000	1,240,000	1,113,000
					Total A-F
Acre-Feet per Quarter	305	230	362	350	1,247

Source: REP Water Balances for AFC Rev 5, Sept. 27, 2004. Reproduced by California Energy Commission Staff.

Water Quality

Process water for the REP will be supplied by the City of Roseville through the City's PGWWTP. The PGWWTP will supply tertiary treated recycled water that has undergone screening, grit removal, extended aeration, secondary clarification, filtration, chlorination, and dechlorination. The recycled water will meet the California Code of Regulations, Title 22, Division 4 requirements for "unrestricted use."

All recycled water pipelines, storage tanks, and ancillary facilities will be constructed in compliance with Titles 17 and 22. Title 17 addresses the requirements for backflow prevention and cross connections, while Title 22 addresses public health and use restrictions. A Title 22 Engineering Report must be submitted and approved by the State Department of Health Services and the Central Valley Regional Water Quality Control Board (CVRWQCB). The CVRWQCB will issue reclamation requirements to ensure that the recycled water is properly treated and safely used.

Use of recycled water will cause the least impact to the environment and is consistent with state water policy for water conservation and maximum reuse of wastewater.

Construction Water Supply

Based on data provided by the RE in their December 8, 2003, Supplement in Response to Data Adequacy Comments, construction water use for the REP by project element is presented in **Soil and Water Resources Table 3**. As shown, the maximum amount of construction water for the REP site and laydown area is estimated to peak at 1,400,000 gpd and have an annual requirement of 9.1 mgy.

Soil and Water Resources Table 3
REP Construction Water use by Project Element

REP Element	*Peak Daily Requirements (gpd)*	*Annual Requirements (gpy)*
Plant and Laydown Area	1,400,000	9,100,000
Natural Gas Pipeline	110,000	1,400,000
Transmission Line	15,000	500,000

Source: Roseville 2003b, Table 8.15 S1, pg. S 56

The PGWWTP began discharging 2 mgd of tertiary treated wastewater to Pleasant Grove Creek on June 29, 2004. The Recycling Act of 1991 (Water Code § 13575 et seq.) encourages the use of recycled water where applicable. Due to the proximity of the REP to the PGWWTP, the use of recycled water for soil compaction, dust suppression and other major construction activities is feasible and economically achievable. Therefore, the use of recycled water for all major construction activities is encourages under State law and is consistent with the City's Recycle Water Policy (Roseville Municipal Code Section 14.17.010 B). Staff recommends Condition of Certification **SOIL & WATER 6** to require the use of recycled water for all major REP construction activities, hydrostatic testing and all other nonpotable uses to ensure that no surface or groundwater suitable for potable use will be used in the construction or testing of any REP element.

Spill Prevention

The REP draft Spill Prevention Control and Countermeasure (SPCC) Plan covers chemical spill control and management of the hazardous materials that will be stored and used onsite. As described in the draft SPCC and draft SWPPP, hazardous materials at the REP will be stored indoors in watertight containers and/or surrounded by secondary containment structures. Bermed containment will be used in areas used for bulk hydrocarbon storage. Some of the hazardous materials used during construction include petroleum hydrocarbons, cleaning fluids and solvents.

Acutely hazardous materials stored on-site during operation of the proposed REP facility include sulfuric acid and aqueous ammonia. Those materials would be stored in above ground storage tanks that would be surrounded by curbed concrete containment basins. Other containment/treatment facilities include berms, concrete sumps, and an oil/water separator. Staff does not expect significant impacts to result from on-site spills due to the procedures and BMPs described above and included in the draft SPCC and draft SWPPP (CH2MHill 2004b and CH2MHill 2004d). See the **Hazardous Materials Management** section of this document for further information regarding the use of these materials.

GROUNDWATER

Water Supply

The City uses groundwater for short term backup supply during dry years and has four wells capable of producing a combined output of 6,600 AFY. RE proposes to use an on-site well to provide groundwater for domestic and sanitary purposes at the REP site. Consumption is expected to be approximately 0.5 gpm, which is less than 1AFY. The City has tested a nearby well and confirmed that it meets quality and pressure standards for use as a potable water source for the REP. Water quality parameters for local groundwater are reported in **Soil and Water Resources Table 1** (Roseville 2003a, Section 8.15.2.2).

Under Condition of Certification **SOIL & WATER 5**, RE is required to submit for review and approval a master water, sewer, and recycled water plan for the REP, which must show the location of the on-site water source (i.e. the well location) and its method of storage, distribution and treatment. Compliance with Condition of Certification **SOIL & WATER 5** will ensure that the potable water supply for the REP will comply with all State and local LORS.

Water Quality

Activities at REP will have minimal potential to impact groundwater resources in the project area. The depth to groundwater is estimated to be more than 100 feet below the REP surface. Stormwater runoff from the hazardous materials containment portions of the plant site will be discharged through an oil/water separator and then to the cooling tower basin. Stormwater runoff from other portions of the plant site will be directed by surface flow through a collection of catch basins and ditches to the on-site stormwater detention ponds. No underground chemical storage tanks are proposed at the project site. No releases of contaminated stormwater from the plant site are expected.

Spill Prevention

Solid wastes and small amounts of hazardous waste that are generated will be properly accounted for, tracked, handled, and disposed of off-site using licensed transporters and disposal facilities. No significant impacts to groundwater resources are expected from the construction or operation of the REP project.

WASTEWATER DISCHARGE

Construction Wastewater

The construction phase of REP will require minimal dewatering requirements. All excavations will be above the existing water table. Dewatering requirements are expected to consist of stormwater from plant excavations only. The quantity of stormwater collected is expected to result in only several days of dewatering during construction. For the REP project, it is expected that the potential for site dewatering will only occur over a single rain season. The maximum daily dewatering discharge is estimated to be 72,000 gallons.

Water used for dust control and soil compaction during construction will not result in discharge. During the construction period, sanitary waste will be collected in portable toilets (no discharge) supplied by a licensed contractor and disposed of at an appropriate receiving facility. Equipment wash water will be collected and disposed of off-site (Roseville 2003a, Section 8.15.2.4).

As proposed, hydrostatic test water for the natural gas pipeline will be drawn from City potable water supplies. Approximately 50,000 gallons of water will be used for hydrostatic testing of power plant piping. The use of potable water for this purpose is incompatible with both The Recycling Act of 1991 (Water Code § 13575 et seq.), which encourages the use of recycled water where applicable and the City's Recycle Water Policy (Municipal Code Section 14.17). Currently the PGWWTP is discharging 2 mgd of tertiary treated recycled water to Pleasant Grove Creek. The plant will produce an average supply of approximately 6.5 mgd in 2005. Instead of discharging this water to Pleasant Grove Creek, the City would rather use it to offset potable water use and makes it available to City customers at half the cost for City supplied potable water (Municipal Code Section 14.17.080). As with the use of construction water, staff recommends the use of recycled water for hydrostatic testing and conditions its use in **Condition of Certification SOIL & WATER 6**.

Hydrostatic test water will be chemically analyzed for contaminants and discharged into a dewatering structure. Depending on water quality, the water will be discharged into the City of Roseville sanitary wastewater system or to tributary drainages to Pleasant Grove Creek under the appropriate State and City discharge permits. Both the use and discharge of recycled water for hydrostatic testing are not expected to affect waters of the state.

Cooling Tower Blowdown

Circulating (or cooling) water system blowdown will consist of recycled water that has been concentrated by approximately five cycles of concentration and will contain the residue of the chemicals added to the circulating water. Cooling water treatment will require the addition of a pH control agent, a mineral scale dispersant, corrosion inhibitors, and biocides. The waste stream will be treated in an on-site ZLD system where the water evaporated by the brine concentrators will be reclaimed using a condenser producing a distillate very low in total dissolved solids (TDS). The distillate will be recovered for reuse within the REP. The resulting residue from the ZLD process will be disposed of at an appropriately licensed facility. No impacts to surface or groundwater resources are anticipated (Roseville 2003a, Section 8.15.2.4).

Zero Liquid Discharge

All process wastewater streams (oil/water separator effluent, filter backwash, quenched HRSG blowdown, crystallizer condensate, and excess distillate) will be directed to the cooling tower for initial concentration and then to the ZLD system. The volume of the cooling tower blowdown going to the ZLD is expected to be from 96 to 116 gpm under average conditions and from 267 to 278 gpm under peak conditions.

The brine concentrators of the ZLD system will use heat to evaporate approximately 96 percent of the feed water. The concentrated brine will be sent to the crystallizers

where it will be further concentrated into a salt sludge. The sludge will be dewatered using either a filter press or belt press. The residual solid waste exiting the press will be discharged to a storage bin. The relatively dry solid waste will be transported off-site for disposal at an appropriate landfill. Operation of the REP will produce approximately 121 tons of solid waste per year if operated at its full permitted output (Roseville 2003a, Section 7.4.1.1).

Since all process wastewater will be eliminated through the ZLD process, the operation of the REP will not cause or contribute to impacts to surface or groundwater resources.

Sanitary Wastewater

The project will include sanitary facilities designed to handle the plant's domestic wastewater. No septic tanks are proposed on-site and sanitary wastes from the REP will be conveyed via pipeline to the PGWWTP. Therefore, no potential adverse impacts to surface or groundwater sources are anticipated (Roseville 2003a, Section 8.15.2.6).

Plant Drainage

Miscellaneous plant drainage will consist of process water drainage, equipment leakage, and drainage from facility containment areas. Water from those areas will be collected in a system of floor drains, sumps, and pipes within the REP and discharged to an oil/water separator. The oil free discharge water will be recycled to the cooling tower basin. Oil collected by the oil/water separator will be transported off-site for disposal or recycling. No potential adverse impacts to surface or groundwater resources are expected.

SURFACE WATER QUALITY AND FLOODING

The 10 year storm will cause surface water runoff from the developed REP site to increase from 5.7 cfs to 9.1 cfs for a net increase of 3.4 cfs. The 100-year stormwater runoff is estimated to increase from 13.4 cfs to 18.1 cfs for a net increase of 4.7 cfs (Roseville 2003a, Section 8.15.2.5). Post development runoff rates for the 10 year and 100-year storm are not excessive. The HEC-RAS modeling of pre and post WRSP runoff confirms that detention of stormwater runoff is not desirable in the location of the REP (*Master Drainage Study for the Fiddyment and Westpark Properties*, June 2003).

The operation of the detention ponds for on-site stormwater runoff will be based on continuous releases during storm event as described in the draft SWPPP and will be in accordance with the provisions of the NPDES permit. No potential adverse impacts to surface water resources are anticipated.

ANALYSIS OF CUMULATIVE IMPACTS

Erosion Control and Stormwater Management

Stormwater runoff typically increases with urbanization and new construction activities. REP construction and operation will only have minor and temporary effects on soil resources. Stormwater discharge will adhere to a SWPPP/ESCP BMPs and is expected to comply with both the City of Roseville and CVRWQCB water quality standards. Contribution to cumulative erosion and sediment impacts are expected to be

minor. Therefore, the REP will not contribute significantly to cumulative impacts to soil resources.

Surface Water

Water Supply

REP's cooling, process makeup, fire suppression, and landscape irrigation water will be supplied entirely by tertiary treated recycled water from the PGWWTP. The PGWWTP is designed and permitted to treat approximately 12.5 mgd average dry weather flow (CH2MHill 2004f, DR 83).

The PGWWTP went into operation on June 22, 2004. The plant will produce an average supply of approximately 6.5 mgd in 2005, increasing to 12.5 mgd by 2020. The REP will use 0.71 mgd of recycled water for cooling under average conditions (1.71 mgd under maximum conditions). The PGWWTP will have an adequate supply of tertiary treated water for the needs of the REP and other recycled water needs. The use of recycled water by the REP will not affect the City's potable water supply or the regional demand for fresh water. Therefore, no significant cumulative impacts are expected.

Groundwater

The City of Roseville's Water Forum Agreement (WFA) allows the City to use a maximum of 6,500 AFY of groundwater (the sustainable groundwater extraction rate), which is to be used during dry years as defined by the WFA. The Water Forum is a group of stakeholders that negotiated and signed the WFA in order to guide sustainable water use of the lower American River (Water Forum 2000). REP groundwater usage is projected to be less than 1 AFY and will be less than 0.02 percent of the groundwater resources allotted to the City of Roseville under the WFA (Roseville 2003a, Section 8.15.2.6).

No significant cumulative impacts are expected to groundwater resources since the amount of groundwater required to meet the REP's potable needs is so small. Condition of Certification **SOIL & WATER 6** prohibits the use of groundwater suitable for potable use to be used in the construction or testing of any element of the REP.

Wastewater Discharge

Since there will be no wastewater discharge from the REP, there will be no cumulative impacts to water quality. Sanitary wastewater will be piped to the PGWWTP, but the volume is small and will not cause a significant cumulative impact.

Surface Water Quality and Flooding

The REP and PGWWTP are bound on three sides by the Fiddyment and Westpark properties, which will be developed under the WRSP. The WRSP incorporates the 3,162 acres of the Fiddyment and Westpark properties for mixed land use development and is expected to have a 15 year build-out horizon.

Based on the pre and post development HEC-RAS modeling in the June 2003 ***Master Drainage Study for the Fiddyment and Westpark Properties***, the location of the REP and operation of its on-site detention ponds will not contribute to flooding or water quality degradation of Pleasant Grove Creek or its tributary. No cumulative impacts to surface water quality or flooding are expected from construction or operation of the REP.

MITIGATION

APPLICANT'S PROPOSED MITIGATION

Erosion and Water Pollution Control

RE provided a draft SWPPP that identifies temporary and permanent erosion and water pollution control BMPs. The draft SWPPP for the construction of the REP identifies the following BMPs and commits RE to:

- Stabilize disturbed areas that will not be covered with surface structures or pavement following grading and/or cut and fill operations;
- Selectively salvage and replace topsoil in areas to be disturbed or excavated along pipeline routes and where vegetation is present before construction;
- Limit soil erosion/dust generation by wetting active construction areas with water;
- Install detention ponds to minimize off-site discharge of sediments;
- Provide storm drain inlet protection to prevent sediment laden runoff from entering inlets or catch basins;
- Use silt fences, straw bale barriers, and fiber rolls to intercept sediment laden runoff from disturbed soil;
- Provide designated storage areas for construction wastes, hazardous materials, paints, and related products along with covered dumpsters and containers for waste and recyclables;
- train employees on stormwater quality management;
- Implement a spill prevention and control plan;
- Remove construction wastes in a timely manner;
- Store all liquid wastes in covered containers;
- Provide emergency spill containment kits and materials in areas of potential hazardous materials release;
- Provide for contaminated soil identification and disposal; and
- Provide dewatering provisions in the SWPPP in the event of groundwater contact or stormwater inflow during excavation.

STAFF PROPOSED MITIGATION

Soils

Staff recommends that RE be required to meet stormwater requirements of the general NPDES permit. As required by CVRWQCB Order 99-08-DWQ, a SWPPP would be implemented to minimize pollutants in stormwater for the entire project. The SWPPP should incorporate any erosion and sediment control or water quality protection measures that may be required in the ACOE Nationwide Permit. In addition, RE will be required to develop and implement a site specific ESCP for the entire project (including ancillary facilities) that addresses standard erosion runoff and sedimentation impacts for construction, post-construction, and operational phases. This plan will comply with all applicable City of Roseville requirements. Those requirements are addressed in Conditions of Certification **SOIL & WATER 1, 2 & 3**. RE must revise the draft plans to incorporate the final design of the proposed project and meet applicable drainage and grading requirements. Staff has identified needed amendments and additions that include, but are not limited, to the following:

Storm Water Pollution Prevention Plans

For both the Construction and Industrial SWPPPs, water pollution control and stormwater management drawings must accompany the narrative portion of the plan. All drawings and narrative must be detailed, specific, and include the following elements for the proposed REP.

- Graphics/drawings that show topographic features of all proposed project elements including those related to the construction corridors of all proposed pipelines, and the 16.5 acre laydown area. The mapping scale shall be 1"= 100' or less (1"=50' recommended). The graphics/drawings must depict the surrounding area including existing linears, structures, drainage facilities and diversion swale(s).
- All proposed facilities including stormwater control features shall be shown on the site plan drawings. The drawings shall contain a complete mapping symbol legend that identifies all existing and proposed features including the soil boundary(s) and a limit of construction. The limit of construction boundary shall include the project site, pipelines, laydown and stockpile areas. The limit of construction ensures all work is confined to the proposed REP construction area in order to protect the surrounding areas not involved in construction or operation of the REP.
- Provide a detailed and specific construction sequence that addresses the entire sequence of events from initial site mobilization to final site stabilization (e.g. vegetation/asphalt).
- All site specific BMPs must be depicted on the water pollution control and stormwater management drawings and discussed in the narrative.

Erosion and Sediment Control Plan

Erosion and sedimentation are concerns at the REP construction site and pipeline corridors. Additional measures beyond those proposed in the AFC are needed to protect soil and water resources in the vicinity of the REP. RE must implement a site specific ESCP that includes the following elements.

Vicinity Map – A map shall be provided indicating the location of all project elements with depiction of significant geographic features to include watercourses, creeks, wetlands, and sensitive habitat.

Site Delineation – The REP site and all project elements shall be delineated showing boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities.

Watercourses and Critical Areas – The ESCP shall show the location of watercourses and critical areas such as creeks, rivers, wetlands and other environmentally sensitive areas. Indicate the proximity of those features to the REP construction site and all pipeline construction corridors.

Drainage – The ESCP shall provide a topographic site map showing existing, interim and proposed drainage systems; drainage area boundaries and water shed sizes in acres; the hydraulic analysis to support the selection of BMPs to divert off-site drainage around or through the plant and laydown areas; and all pipeline trenching and boring sites. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.

Clearing and Grading – The plan shall provide a delineation of areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slope, location, and extent of all proposed gradings as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography. The ESCP shall include a statement of the quantities of material excavated or filled for each element of the REP (site and pipeline corridors), whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

Project Schedule – The ESCP shall identify on the topographic site map the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.

Best Management Practices – The ESCP shall show the location, timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, and final grading/stabilization. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances.

Erosion Control Drawings - The erosion control drawings and narrative must be designed and sealed by a professional engineer/erosion control specialist.

Those elements of the ESCP that are also required in the SWPPP can and should be referenced in the construction SWPPP.

Ground Water

To mitigate any potential adverse impacts to local fresh water supplies or other users of fresh water, staff is recommending that RE use recycled water for all nonpotable uses. Staff recommends Condition of Certification **SOIL & WATER 6** to ensure that no surface or groundwater suitable for potable use shall be used in the construction or testing of any REP element.

Surface Hydrology

As proposed, REP is to be operated as a ZLD facility thereby eliminating the need to obtain a NPDES permit other than for stormwater discharges. RE will be required to comply with the general NPDES requirements that regulate stormwater discharges and implement the SWPPPs. RE will be responsible for all monitoring and reporting guidelines and other provisions included in the general stormwater permits. This requirement is contained in Conditions of Certification **SOIL & WATER 1 & 3**.

Stormwater

As stated in the **Surface Hydrology** mitigation discussion above, RE will be required to comply with the NPDES requirements that regulate stormwater by establishing effluent limitations and monitoring and reporting requirements for construction and industrial activities (operational) dictated by the stormwater general permit. The developer will need to file a notice of intent with the CVRWQCB and revise the draft SWPPP to be site specific and comply with the guidelines provided in Water Quality Order 99-08-DWQ.

COMPLIANCE WITH LORS

The proposed REP has been considered with regard to applicable laws, ordinances, regulations and standards (LORS). Staff believes that if the proposed conditions of certification are required and implemented, the project will comply with LORS.

FACILITY CLOSURE

The planned operational life of the REP is 30 years. However, the REP could operate for an indefinite period of time depending on its economic viability. An early decommissioning and/or mothballing are also possible. When the facility is closed, the closure procedure will follow a decommissioning plan to be prepared by RE and approved by the Energy Commission Compliance Project Manager.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

The following are the comments to the **Soil and Water Resources** portion of the Preliminary Staff Assessment contained in Roseville Electric's Supplemental Comments On The Preliminary Staff Assessment dated August 11, 2004 (G&B 2004c).

Roseville Electric: *Page 4.9-6, last line* -- RE is not proposing a plume-abated wet cooling tower. Please delete the reference to "plume abated*."*

Staff's Response: Reference to "plume abated" has been removed."

Roseville Electric: *Page 4.9-8, First Paragraph, Natural Gas Pipeline* – PG&E should be substituted for RE … since PG&E will be constructing the natural gas pipeline and not the City of Roseville.

Staff's Response: Substitution has been made.

Roseville Electric: *Page 4.9-8, Last Paragraph, Natural Gas Pipeline* – Please modify this paragraph to reflect that PG&E will be constructing the natural gas pipeline and not the City of Roseville.

Staff's Response: Modification has been made.

Roseville Electric: *Page 4.9-10, Fifth Paragraph* – Staff raises concerns about the design and location of the PGWWTP influent junction structure. That structure is existing and is not part of the REP. Therefore, staff should delete any opinions regarding the influent junction structure since it is unrelated and should be outside CEC jurisdiction.

Staff's Response: Staff raised concern over the location of the influent junction only and has no concerns regarding its design. As provided by CH2MHill on their Conceptual Project Construction Area Boundaries and FEMA Floodplain map (shown as **Soil and Water Resource Figure 1)**, the PGWWTP influent structure is located within the 100-year floodplain.

Because of the potential for raw sewage contact with floodwater from a 100-year flood, staff raised this issue in the PSA. Based on a follow-up site visit on August 27, 2004, staff observed that the influent junction is located on an elevated knoll above the 100-year floodplain. Staff has removed the text stating that the influent junction will be inundated by floodwater and the corresponding potential for surface water contact with raw sewage.

Roseville Electric: *Page 4.9-13, First Paragraph* – Staff states that with the 100-year flood level above 83 feet amsl at the outfall location, the lower detention pond is subject to inflow from the tributary during the 100-year flood. Staff goes on to state that no analysis has been provided by the applicant on the potential impacts from this reverse flow. As a point of clarification, the City of Roseville HEC-RAS analysis predicts a 100-year hydraulic grade line of 82.85 feet, not "above 83 feet", at the location where the REP stormwater outfall will discharge.

Staff's Response: Based on a 100-year hydraulic grade line of 82.85 feet at the location where the REP stormwater outfall will discharge, this floodwater elevation is still higher than the 81.5 foot elevation of the lower detention pond as shown of Figure 5 of the draft Construction SWPPP (CH2MHill 2004b).

Since the post-construction run-off and drainage patterns for the developed site are still conceptual and have been modified as shown on Drawing RE-S-1003 (G&B 2004d), staff relies on Condition of Certification **SOIL&WATER 3** to ensure that contaminated stormwater does not leave the REP site.

Roseville Electric: *Page 4.9-13,* ***Soil and Water Resources Table 2*** – Staff has created a table indicating annual water requirements for various systems. Staff should provide a note to the table that these numbers were not provided by RE and were calculated by staff.

Staff's Response: The table has been revised and the note has been included.

Roseville Electric: *Page 4.9-14, Second to Last Paragraph* – Staff describes a discrepancy that it characterizes as "large" and requiring additional information … Staff has the most current information and can complete its finale analysis. The request for additional information should be deleted.

Staff's Response: The request for additional information has been deleted and the analysis completed.

Roseville Electric: *Page 4.9-15,First Full Sentence* – Staff misquotes Section 14.17.010 of the City Municipal Code by stating that the use of recycled water for all construction activities is required. The exact language of the Code should be included.

Staff's Response: The use of recycled water for construction activities is consistent with Section 14.17.010 of the City Municipal Code. Furthermore, in conjunction with the Recycling Act of 1991 (Water Code § 13575 et seq.) the use of recycled water for soil compaction, dust suppression and other major construction activities is feasible and economically achievable. Staff recommends Condition of Certification **SOIL&WATER 6** to require the use of recycled water for all major REP construction activities, hydrostatic testing and all other nonpotable uses to ensure that no surface or groundwater suitable for potable use will be used in the construction or testing of any REP element.

Roseville Electric: *Page 4.9-22, Proposed Condition of Certification* ***SOIL&WATER 1*** — RE requests that staff replace its version of this condition with **SOIL&WATER 1** included in the Final Decision for the Turlock Irrigation District Walnut Energy Center Project …

Staff's Response: Condition of Certification **SOIL&WATER 1** has been replaced as requested.

Roseville Electric: *Page 4.9-23, Proposed Condition of Certification* ***SOIL&WATER 2*** — RE requests that staff replace its version of this condition with **SOIL&WATER 2** included in the Final Decision for the Turlock Irrigation District Walnut Energy Center Project …

Staff's Response: Condition of Certification **SOIL&WATER 2** has been replaced as requested but the **Verification** contains specific staff proposed elements.

Roseville Electric: *Page 4.9-24 and 25, Proposed Condition of Certification* ***SOIL&WATER 4*** — Staff's proposed condition requires that recycled water be used for all construction and hydrostatic testing. Staff relies on City of Roseville Municipal Codes Section 14.17.010 B for such requirement. However, the Code Section does

allow for the use of potable water under certain circumstances such as the availability and feasibility of recycled water and facilities to deliver the water. Therefore, RE requests staff simply reference the City of Roseville Municipal Code in the Condition to provide clarity.

Staff's Response: Staff relies on the Recycling Act of 1991 (Water Code § 13575 et seq.) as the State law requiring the use of recycled water for soil compaction, dust suppression and all other nonpotable uses. Condition of Certification **SOIL&WATER 4** has been renumbered as Condition of Certification **SOIL&WATER 6**, which requires the use of recycled water for all major REP construction activities, hydrostatic testing and all other nonpotable uses to ensure that no surface or groundwater suitable for potable use will be used in the construction or testing of any REP element.

Roseville Electric: *Page 4.9-25, Proposed Condition of Certification* ***SOIL&WATER 5*** — The reporting requirements of this condition are burdensome and are not necessary to ensure that the REP is using recycled water.

Staff's Response: Condition of Certification **SOIL&WATER 5** has been renumbered as Condition of Certification **SOIL&WATER 7** and is a standard condition for all projects. Due to reporting requirements of the Energy Commission, the information requested is necessary for statewide water management and usage reporting.

Roseville Electric: *Page 4.9-27, Proposed Condition of Certification* ***SOIL&WATER 7*** — RE requests that this condition be modified to reflect that PG&E will be building the natural gas pipeline and therefore the condition should be applicable only to the sanitary wastewater pipeline.

Staff's Response: Condition of Certification **SOIL&WATER 7** has been renumbered as Condition of Certification **SOIL&WATER 9**. RE as the expect project owner is responsible for all elements of the REP and is required to submit a depth of scour analysis as outline in Condition of Certification **SOIL&WATER 9**.

The City of Roseville Community Development Department provided 65 General Conditions of Approval for the REP in a letter from Ms. Patty Dunn, Assistant City Manager/Community Development Director dated August 18, 2004 (CRCD 2004a).

General Conditions of Approval 2, 3, 17, and 46 apply to the protection of soil and water resources and are addressed below.

General Condition of Approval 2 requires RE to submit for review and approval a master water, sewer and recycled water plan for the REP site. Staff agrees that those master plans are required and has reflected this in Condition of Certification **SOIL&WATER 5**.

General Condition of Approval 3 requires that all recycled water pipelines, storage tanks, and ancillary facilities be constructed in compliance with CCR, Title 17 and Title 22. As a requirement of Title 22, an Engineering Report must be submitted and approved by the Department of Health Services, the CVRWQCB, and the City of

Roseville. Staff has included those requirements in Condition of Certification **SOIL&WATER 6**.

General Condition of Approval 17 requires that all storm drainage shall be collected on-site and shall be routed to the nearest storm drain system or natural drainage facility. Prior to discharge from the site, the stormwater shall be treated through a stormwater pond or other measure approved by the Public Works Director. Staff has included those requirements in Conditions of Certification **SOIL&WATER 1 and 3**.

General Condition of Approval 46 requires that all back flow devices shall be tested and approved by the Environmental Utilities Department. Because the REP will be using recycled water, the project owner must comply with the requirements of CCR Title 17, which addresses the installation and inspection of backflow prevention and cross connection devices. Staff has included those requirements in Condition of Certification **SOIL&WATER 6**.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the use of recycled water for cooling purposes and the ZLD system at REP is environmentally beneficial and will conserve fresh water supplies. In addition to mitigation proposed by RE, staff recommends additional mitigation to prevent acceleration of erosion, increases in off-site sedimentation and contamination of soils and water resources. Staff is concerned that RE proposes to use potable or water suitable for potable use for construction of the REP and pipeline hydrostatic testing. Conditions of Certification are recommended to address staff's concerns regarding those impacts. If the proposed conditions of certification are required and implemented, impacts associated with the project will be insignificant.

CONDITIONS OF CERTIFICATION

SOIL&WATER 1: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan for the construction of the entire project (construction SWPPP). The project owner shall submit copies of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board (CVRWQCB) and the City of Roseville regarding this permit to the CPM.

Verification: The project owner shall submit to the CPM copies of all correspondence between the project owner and the CVRWQCB and the City of Roseville about the General NPDES permit for the Discharge of Storm Water Associated with Construction Activities within 10 days of its receipt (when the project owner receives correspondence from the CVRWQCB or the City) or within 10 days of its mailing (when the project owner sends correspondence to the CVRWQCB or the City). This information shall include copies of the Notice of Intent and Notice of Termination for the project.

SOIL&WATER 2: Prior to beginning any site mobilization activities for any project element, the project owner shall obtain CPM approval for a site specific Drainage, Erosion and Sedimentation Control Plan (ESCP) that addresses all project elements and ensures protection of water quality and soil resources; demonstrates no increase in off-site flooding potential or sedimentation; meets local requirements; provides legible drawings and complete narrative; and provides for monitoring and maintenance of all mitigation measures under the ESCP. The ESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL 1** and may incorporate by reference any SWPPP developed in conjunction with any NPDES permit.

Verification: No later than 60 days prior to the start of any site mobilization activities for any project element, the project owner shall submit a copy of the ESCP to the City of Roseville for review and comment. All City comments shall be provided to the CPM within 30 days of receipt of the ESCP by the City. The ESCP must be approved by the CPM prior to start of any site mobilization activities for any project element. During construction, the project owner shall provide a report in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control activities and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities. The ESCP shall include the following elements.

- ***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depiction of significant geographic features to include watercourses, creeks, wetlands, and sensitive habitat.
- ***Site Delineation*** – The REP site and all project elements shall be delineated showing boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities.
- ***Watercourses and Critical Areas*** – The ESCP shall show the location of watercourses and critical areas such as creeks, rivers, wetlands and other environmentally sensitive areas. Indicate the proximity of those features to the REP construction site and all pipeline construction corridors.
- ***Drainage*** – The ESCP shall provide a topographic site map showing existing, interim and proposed drainage systems; drainage area boundaries and water shed sizes in acres; the hydraulic analysis to support the selection of BMPs to divert off-site drainage around or through the plant and laydown areas; and all pipeline trenching and boring sites. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.
- ***Clearing and Grading*** – The plan shall provide a delineation of areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slope, location, and extent of all proposed gradings as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography. The

ESCP shall include a statement of the quantities of material excavated or filled for each element of the REP (site and pipeline corridors), whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

- ***Project Schedule*** – The ESCP shall identify on the topographic site map the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- ***Best Management Practices*** – The ESCP shall show the location, timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, and final grading/stabilization. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances.
- ***Erosion Control Drawings*** -- The erosion control drawings and narrative must be designed and sealed by a professional engineer/erosion control specialist.

SOIL&WATER 3: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of REP (operation SWPPP). The project owner shall submit copies to the CPM of all correspondence between the project owner and the CVRWQCB and the City of Roseville.

Verification: The project owner shall submit to the CPM a copy of the operation SWPPP prior to commercial operation and copies of all correspondence between the project owner and the RWQCB and the City of Roseville about the General NPDES permit for the Discharge of Storm Water Associated with Industrial Activity within 10 days of its receipt (when the project owner receives correspondence from the RWQCB or the City) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB or the City). This information shall include copies of the Notice of Intent and Notice of Termination for the project.

SOIL&WATER 4: The project owner shall obtain and provide a copy of the Streambed Alteration Agreement; CWA 401, CWA 404; and adopted waste discharge requirements permits as appropriate, or proof that they are not needed, prior to site mobilization activities. Site modifications required by any of those permits may require evaluation by the CPM prior to issuance of the final construction permit.

Verification: No later than 30 days prior to site mobilization for any project element, the project owner shall provide copies of the final, approved Streambed Alteration Agreement; CWA 401,and 404 permits; and adopted waste discharge requirements or written verification that one or more are not needed, to the CPM. All copies of correspondence between any federal, state or local agency regarding those permits will be provided to the CPM within 10 days of its receipt.

SOIL&WATER 5: Prior to beginning any site mobilization activities for any project element, the project owner shall submit for review and approval a master water, sewer, and recycled water plan for the REP.

Verification: No later than 60 days prior to the start of any site mobilization activities for any project element, the project owner shall submit a copy of the master water, sewer, and recycled water plan for the REP to the City of Roseville for review and comment. All City comments shall be provided to the CPM within 30 days of receipt of the plan by the City. The master water, sewer, and recycled water plan must be approved by the CPM prior to start of any site mobilization activities for any project element. The master water, sewer, and recycled water plan for the REP shall include, but shall not be limited to the following:

- All project water, sewer, and recycled water utilities and their points of connection to the City of Roseville's system to include the connection to the PGWWTP recycled water terminal point (located south of Phillip Road) for use of recycled water during construction and pipeline testing.
- All existing backbone infrastructure (i.e. off-site sewer and recycled water utilities).
- The location of the on-site water source (i.e. the well location) and method of storage, distribution and treatment.
- The point of connection of the on-site fire system to the recycled water system for additional fire protection.

SOIL&WATER 6: The REP shall use recycled water for construction, hydrostatic testing, cooling tower makeup, process water, landscape irrigation and all other nonpotable uses. The REP shall comply with all requirements of Title 22 and Title 17 California Code of Regulations. Prior to the delivery of recycled water to the REP, the owner shall submit a Title 22 Engineering Report that has been approved by the Department of Health Services, the CVRWQCB, and the City of Roseville. No surface or groundwater suitable for potable use shall be used in the construction or testing of any REP element.

Verification: At least 60 days prior to the start of construction of the REP recycled water supply and distribution system, the project owner shall submit to the CPM the water supply and distribution system design and Engineering Report approved by the Department of Health Services the CVRWQCB, and the City of Roseville demonstrating compliance with this condition. The water supply and distribution system design shall be included in the final design drawings submitted to the CBO as required in Condition of Certification **CIVIL 1**.

SOIL&WATER 7: Prior to the use of any water by the REP, 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, 1) total volumes of potable and recycled water supplied to the REP, and 2) volumes used for potable water, cooling purposes, non-cooling processes, irrigation, wash water, demineralized water and turbine injection. Those metering devices shall be operational for the life of the project. An annual summary of daily

water use by the REP, differentiating between potable and recycled water, shall be submitted to the CPM in the annual compliance report.

Verification: At least 60 days prior to use of any water source at the REP, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the potable and recycled pipelines serving the project. The project owner shall provide a report on the servicing, testing and calibration of the metering devices in the annual compliance report.

The project owner shall submit a water use summary report to the CPM in the annual compliance report for the life of the project. The annual summary report shall be based on and shall distinguish recorded daily use of potable and recycled water. Included in the annual summary of water use, the project owner shall submit copies of meter records from the City of Roseville documenting the quantities of tertiary treated recycled water provided (in gpd) by the PGWWTP and potable groundwater supplied over the previous year. The report shall include calculated monthly range, monthly average, and annual use by the project in both gallons per minute and acre-feet. After the first year and for subsequent years, this information shall also include the yearly range and yearly average recycled and potable water used by the project.

SOIL&WATER 8: Surface or subsurface disposal of process wastewater or contaminated stormwater from the REP is prohibited. The project owner shall treat all non-sanitary wastewater streams with a zero liquid discharge (ZLD) system that results in a residual solid waste.

Verification: Within 60 days following the commencement of project operations, the project owner shall submit to the CPM the final design of the ZLD system including schematic, narrative of operation, maintenance schedules, on-site storage facilities, containment measures and influent water quality. This information shall also include the results of the Waste Extraction Test of the residual solid waste from the ZLD system. In the annual compliance report, the project owner will submit a status report on operation of the ZLD system, including disruptions, maintenance, volumes of interim wastewater streams stored on-site, volumes of residual solids generated and the landfills used for disposal. REP operation and wastewater production shall not exceed the treatment capacity of the ZLD system.

SOIL&WATER 9: The proposed gas and sanitary wastewater pipelines shall be located below the anticipated depth of scour from a 100 year flood at all creek crossing locations. The depth of pipeline burial shall be extended a sufficient distance away from the creek banks to avoid anticipated lateral erosion. Trenched water crossings shall be constructed during the dry season using "in the dry" construction techniques that avoid trenching within open or flowing water. Creek beds at trenched crossings shall be restored to their natural contours and revegetated.

Verification: At least 60 days prior to site mobilization for the proposed gas and sanitary wastewater pipelines, the project owner shall submit to the CPM, an analysis (plan) prepared by a registered civil engineer. The analysis (plan) shall demonstrate that the proposed pipelines would be below the expected 100 year depth of scour at all creek crossings and will remain at that depth for a sufficient distance from the creek

banks to avoid any lateral erosion that can be reasonably expected to occur during the life of the project. The CPM must approve the analysis (plan) prior to any site mobilization activities for those pipelines.

REFERENCES

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. Submitted to the Docket on February 6, 2004

CH2MHill, Sacramento, California (CH2MHill) 2004b. Applicant's Response to CEC staff Data Request 55 – Storm Water Pollution Prevention Plan for Construction. Submitted to the Docket on February 19, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004d. Applicant's Response to CEC staff Data Request 57 – Spill Prevention, Control, & Countermeasures Plan for Operation. Submitted to the Docket on February 24, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004e. Applicant's Responses to CEC Data Requests 70-71. Submitted to the Docket on March 1, 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004f. Applicant's Responses to CEC Data Request 83. Submitted to the Docket on March 1, 2004.

City of Roseville Community Development Department (CRCD) 2004a. Major Project Conditions of Approval. Submitted to the Docket on August 16, 2004.

Galati & Blek, Sacramento, California (G&B) 2004b. Roseville Electric's Comments on the PSA. Submitted to the Docket on July 16, 2004.

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

Roseville Electric, Roseville, California (ROSEVILLE) 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

Roseville Electric, Roseville, California (ROSEVILLE) 2004a. Biological Assessment for the Roseville Energy Park. Submitted to the Docket on July 8, 2004.

Water Forum 2000. The Water Forum Agreement. http://www.waterforum.org/images/PDF/GLOSSARY.PDF . Pp 404.

Wood-Rogers, Inc. June 2003. Master Drainage Study for Fiddyment-Westpark Properties Volumes I & II.

TRAFFIC AND TRANSPORTATION

Testimony of James Adams and Eileen Allen

INTRODUCTION

The Traffic and Transportation Section of this Final Staff Assessment is an objective analysis of the transportation systems in the vicinity of the project and addresses the Roseville Energy Park's (REP) compatibility with applicable laws, ordinances, regulations, and standards (LORS). It also identifies potential impacts related to the construction and operation of the project on the surrounding transportation systems and roadways, and potential mitigation measures to avoid or lessen those impacts. This analysis also includes an evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, the movement of these workers can increase roadway congestion and also affect traffic flow.

Staff has analyzed the information provided in the Application for Certification (AFC) and other sources to determine the potential for the REP to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

- Title 49, Code of Federal Regulations. Chapter 11, Subchapter C. These authorities establish national standards for the transportation of hazardous materials.
- Title 49, Code of Federal Regulations, Sections 171-177, governs the transportation of hazardous materials, the type of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, Sections 350-399, and Appendices A-G, Federal Motor Carrier Regulations, addresses safety considerations for the transport of goods, materials, and substances over public highways.
- Part 77, Federal Aviation Administration (FAA) Regulations, establishes standards for determining obstructions in navigable airspace and sets forth requirements for notification to the FAA of proposed construction. Notification is also required if the structure or obstruction is more than a specified height and falls within any restricted airspace in the approach to airports.

STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, and the transportation of hazardous materials and rights-of-way. In addition, the California Health and Safety Code addresses the transportation of hazardous materials. Provisions within the California Vehicle Code are as follows:

- Section 353 defines hazardous materials.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- Section 31030 identifies commercial shipping routes for specified waste streams.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- Sections 34000-34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used for the transportation of hazardous materials.
- Section 25160 et seq. address the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- Sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. These sections also require certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code, sections 117 and 660-72, and California Vehicle Code, section 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Street and Highways Code, sections 660, 670, 1450, 1460, 1470, and 1480, regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.
- In accordance with Section 21400 of the California Vehicle Code, and per the California Department of Transportation (Caltrans), all construction within the public right-of-way will need to comply with the “Manual of Traffic Controls for Construction and Maintenance of Work Zones.”

LOCAL

Placer County General Plan

The Placer County General Plan is the major controlling document for growth and development in Placer County and is evaluated and revised every ten years. The 1994 Plan is under revision and the new plan is expected to be adopted by the Placer County Board of Supervisors sometime in 2004. The goals and policies for the County’s transportation and circulation system can be found in Section Three of the 1994 General Plan. A principal goal is to provide for the long-range planning and

development of the county's roadway system to ensure the safe and efficient movement of people and goods (County of Placer 1994).

City of Roseville Comprehensive General Plan, Transportation Element

The Circulation Element of the City of Roseville's General Plan establishes goals, policies, and identifies implementation measures for City traffic and transportation systems, and its provisions are mandated by State law. The Roseville City Council is the administering agency.

The major goals of the Circulation Element are to: ensure that the City's circulation system provides for the safe, efficient, and reliable movement of people and goods; shift from the automobile to other modes of transportation; and provide an adequate level of transportation service for all persons traveling in and through Roseville (City of Roseville 1992). The City General Plan set the performance standards for intersections at LOS C.

The Environmental Impact Report for the West Roseville Specific Plan

The Transportation and Circulation section of the West Roseville Specific Plan describes the roadway improvements that would be needed to meet an acceptable level of service (LOS) when full development of all vacant lands within the sphere of influence is achieved. A portion of the Plan includes roads that surround the REP.

SETTING

REGIONAL SETTING

The REP project site is located in the City of Roseville in Placer County approximately 15 miles north of Sacramento in California's Northern Central Valley. The Sacramento/Roseville region has an extensive transportation system that includes freeways, highways, bus lines, and rail facilities. The major freeways in the general area include U.S. Highways (Interstate [I]) I-5 and 80, and State Routes (SR) SR-99, SR-70, and SR-65. Regional access to the site is provided by SR-99 and I-5 from the west and south, I-80 from the east, and SR-65 from the north (Roseville 2003a, pg. 8.12-1).

Descriptions of some of the critical roads and highways in the study area are provided below. **Traffic and Transportation Figure 1** illustrates the major highways, roads, and other transportation features in the project area.

The City of Roseville's economy is heavily dependent on the extensive network of highways and roads. Traffic congestion has increased substantially in the last ten years as the number of residents traveling to adjacent communities such as Sacramento to the southwest, and Rocklin to the east, has grown. The heavy reliance on the automobile has exacerbated congestion on the City's arterial roads such as Douglas Boulevard and Cirby Way. The population of Roseville has increased by almost 80 percent between 1990 and 2003, and was approximately 91,000 as of January 1, 2003.

This increase has contributed to an even greater reliance on the automobile as the primary means of transportation.

LOCAL SETTING

As shown in **Traffic and Transportation Figure 1**, I-80, SR-65 and SR-99/70 are the three major highways in the area of the project site. I-80 provides access to the site via Riverside Avenue, Cirby Way, Foothills Boulevard, Pleasant Grove Boulevard, Baseline Road, Fiddyment and Phillip Roads. The site can also be reached by utilizing SR-65, Blue Oaks Boulevard, Fiddyment, and Phillip Roads. SR-99/70 provides access via Baseline, Fiddyment and Phillip Roads. Baseline Road and Blue Oaks Boulevard are east-west arterials with at least three lanes east of Fiddyment Road, which is a north-south arterial with two lanes between Baseline Road and Blue Oaks Boulevard. Phillip Road is both an east-west and north-south arterial with two lanes. It is likely that most traffic coming to the site will use I-80 and SR-65.

As is the case throughout the Central Valley, winter (tule) fog is relatively common in the West Roseville area. Motorists using roads in this area experience tule fog from time to time which can reduce visibility substantially and can increase the potential for traffic accidents.

The various route options are discussed in the Site Location and Local Street System section of the AFC. **Traffic and Transportation Figure 2** shows traffic counts at various points along the freeways, and local roads in the project area. It also identifies potential construction worker routes, bus routes, bike lanes, and the gas pipeline routes.

Traffic and Transportation Table 1 gives average annual daily traffic (AADT) and existing peak hourly traffic data along several sections of existing roads in the project area. Pleasant Grove Boulevard west of Foothills Boulevard, and Blue Oaks Boulevard west of Woodcreek Oaks Boulevard, are the busiest roads in the project vicinity. In contrast, Phillip Road west of Fiddyment Road and west of the REP site have relatively little traffic since there is currently little development.

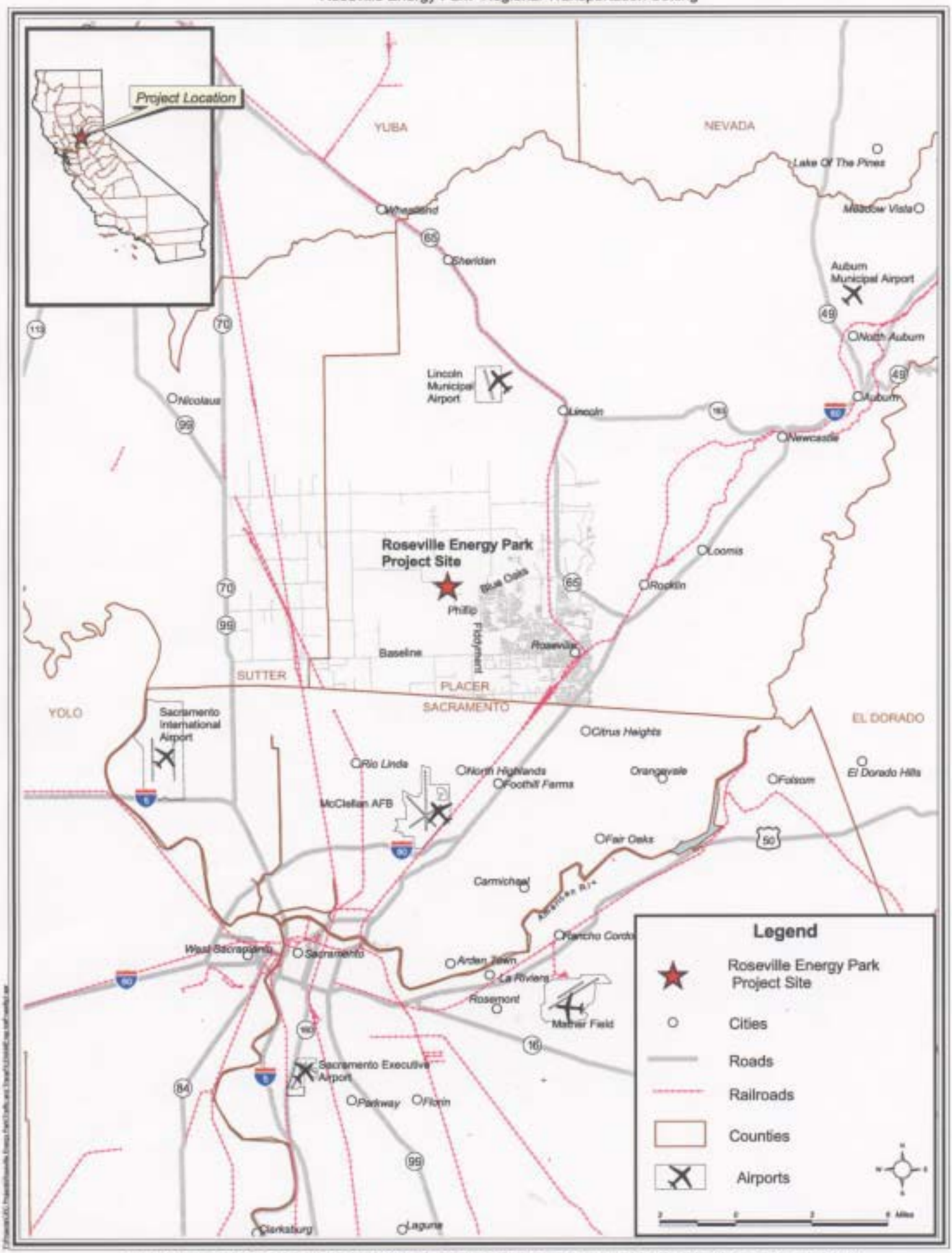
Accident History

The California Highway Patrol's Statewide Integrated Traffic Records System provides a variety of information related to car accidents, including the type and number of accidents, vehicles involved, and conditions that contributed to the accident. In 2000, (the last published data set) the average number of accidents in California at signalized suburban intersections per million vehicles was 0.58. A three-year collision history from April 1, 2001 to March 31, 2004 show that the average collision rate for roads in the local area of the proposed REP site ranges from 0.08 for the intersection of Woodcreek Oaks Boulevard and Blue Oaks Boulevard, to 0.85 for the intersection of Washington Boulevard and Blue Oaks Boulevard. Examples of other accident rates include 0.00 for the intersection of Phillip and Fiddyment Roads, and 0.27 for the intersection of Blue Oaks Boulevard and Fiddyment Road. (City of Roseville 2004d).

Railways

The nearest rail lines are four miles to the east, which includes a major train switchyard, and additional rail lines six miles to the west.

TRAFFIC AND TRANSPORTATION - FIGURE 1
Roseville Energy Park- Regional Transportation Setting



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2004

TRAFFIC AND TRANSPORTATION - TABLE 1

Roseville Energy Park - Existing and REP Traffic Characteristics of Local Roads in the Project Area

Road or Highway	Existing Traffic		Capacities		Existing + Project
	AADT	Peak Hour Traffic	AADT	Peak Hour Traffic	AADT + REP Traffic (LOS)
SR 65 (4-lane expressway) Harding Blvd. To Washington Blvd.	36,000(1)	4,450(1)	80,000	7,200	36,232(A)
SR 99 (4-lane expressway) Baseline Road to Highway 70 Junction	23,700(1)	2,300(1)	80,000	7,200	23,932(A)
Baseline Road (4-lane Arterial) East of Fiddyment Road	12,788(2)	1,667(2)	36,000	3,400	13,020(A)
Brewer Road (2-lane County collector) West of REP Site	551(3)	55(3)	15,000	3,000	783(A)
Fiddyment Road (2-lane arterial) North of Baseline Road	8,766(2)	897(2)	18,000	3,400	8,998(A)
Phillip Road (2-lane County collector) West of Fiddyment Road	157(3)	6(3)	15,000	3,000	389(A)
West of REP site	45(3)	3(3)	15,000	3,000	277(A)
Blue Oaks Blvd. West of Woodcreek Oaks Blvd.	13,741(4)	1,268(4)	36,000	3,600	13,973(A)
Pleasant Grove Blvd. West of Foothills Blvd.	27,760(4)	2,983(4)	36,000	3,600	27,992(C)*
Foothills Blvd. South of Pleasant Grove Blvd.	30,991(4)	3,000(4)	36,000	3,600	31,223(D)

Sources: (1) URS 2001
(2) City of Roseville Traffic Count Database 2001
(3) Placer County 2003
(4) This number is Average Daily Traffic which City of Roseville Engineering staff advised CEC staff is equivalent to AADT.
* Pleasant Grove Blvd. LOS at peak hour is D.

SOURCE: Adapted from AFC Figure 8.12-8

Public Transportation

As noted above, the use of the automobile has increased substantially in the past several years. To counter this trend, the City of Roseville's Circulation Element of the General Plan envisions policies and implementation measures to shift from the automobile to other forms of transportation. This will include car-pooling, transit and non-vehicular modes of travel such as bicycles (City of Roseville 1992). There are several bus routes within the City of Roseville that provide different types of services, schedules, and routes for transit users. Route M utilizes Pleasant Grove Boulevard west to Fiddyment Road and north to Del Webb Boulevard. The closest bus stop is over two miles east of the REP.

Pedestrians and Bicycles

A majority of the roads in the area are well traveled and have sidewalks. Blue Oaks, Fiddyment, and Baseline Roads have sidewalks, and Blue Oaks and Fiddyment Roads have bike lanes. Several roads are scheduled for widening and improvements such as bike lanes. There are bike lanes on Pleasant Grove Boulevard and Baseline Road.

Trucks

The Transportation Element of the Placer County General Plan does not specifically detail size and weight/load limits for any roadways in the county, including those that would be used by large or heavily loaded trucks. Therefore, all applicable regulations are found in the California Vehicle Code. Some notable limits are 20,000 pounds per axle and 10,500 per wheel or wheels on one end of the axle. The Circulation Element of the General Plan has a policy of maintaining a system of truck routes to provide for the safe and efficient movement of goods and to avoid impacting residential neighborhoods (City of Roseville 1992).

Airports

The REP site is located approximately 10 miles south of the Lincoln Airport located along SR-65, and is about 20 miles southwest of the Auburn Airport which is located near the junction of SR-49 and I-80. The largest aviation facility in the general area is the Sacramento International Airport located 25 miles southwest of the REP site along I-5. FAA Form 7460-1 would not be required since the plant would not be within an airport control zone, which is generally within a five-mile radius (FAA 2002). For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.3. nautical miles[1] from the runway).

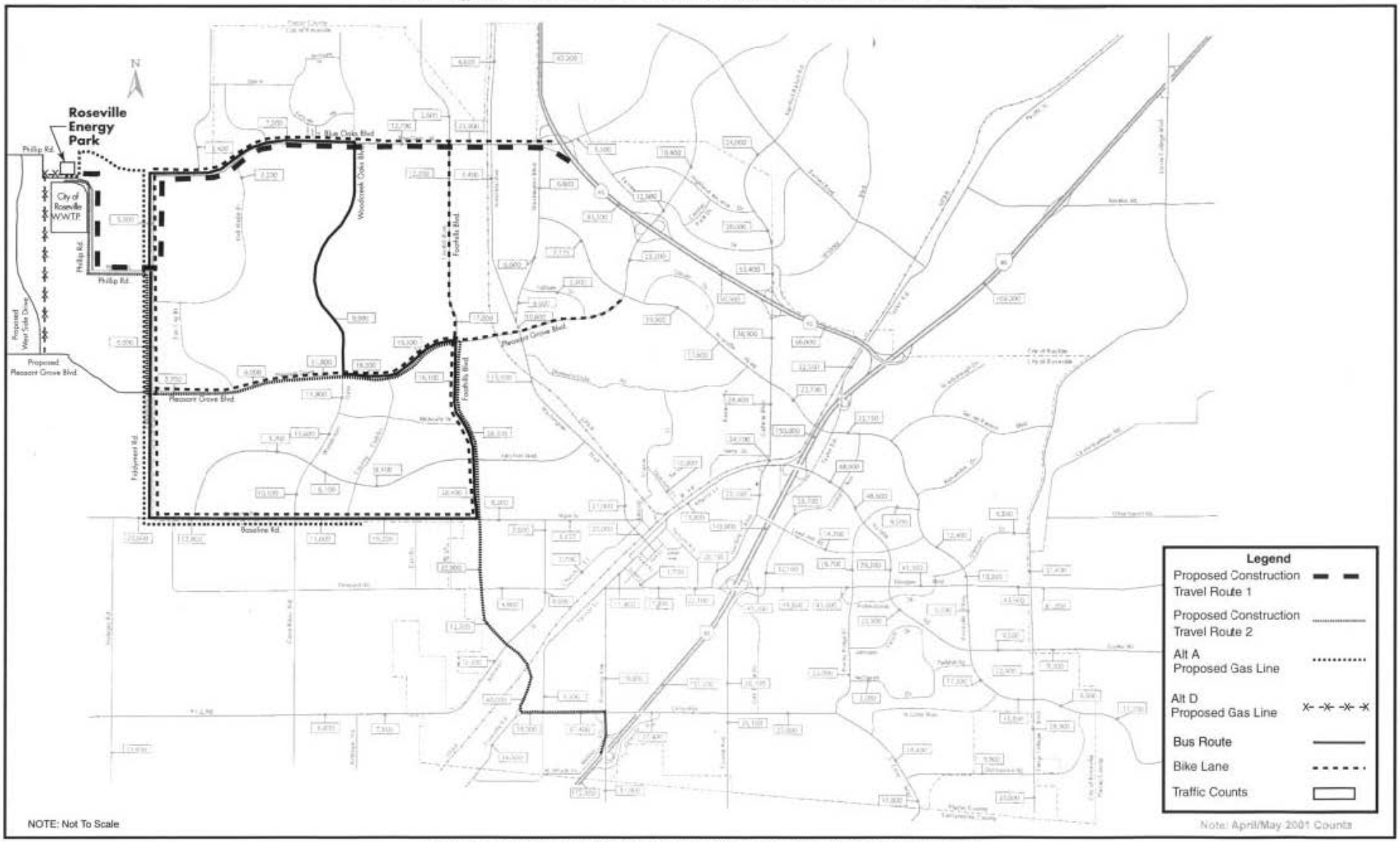
CURRENT ROADWAY AND INTERSECTION OPERATING CONDITIONS

When evaluating a local transportation system, staff uses levels of service (LOS) measurements as the foundation on which to base its analysis. LOS measurements represent the flow of traffic. In general, LOS range from "A" with free flowing traffic, to "F," which is heavily congested with flow stopping frequently. The City General Plan set the performance standards for intersections at LOS C. **Traffic and Transportation Figure 1** displays existing LOS levels for the sections of roads in the REP vicinity based

[1] A nautical mile contains 6,076 feet, whereas a linear mile contains 5,280 feet.

TRAFFIC AND TRANSPCRTATION - FIGURE 2

Roseville Energy Park - Traffic Counts, Potential Construction Worker Routes, Gas Line, Bus Routes and Bike Lanes



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: EIR for the West Roseville Specific Plan - Volume 1 - Figure 4.3-2 and Figure 5.1-1 - CH2MHILL

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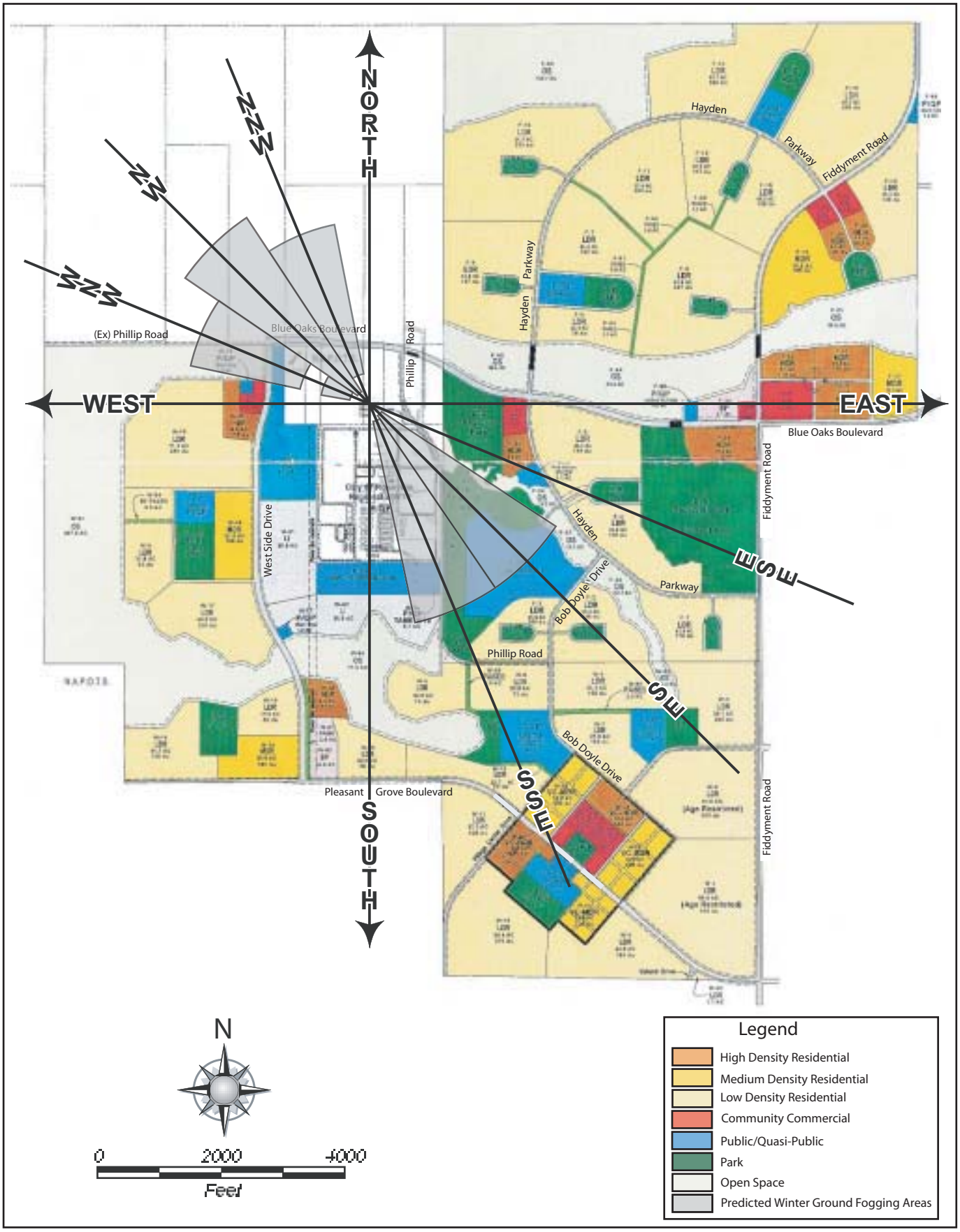

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on average daily traffic and peak hour volume. Both Pleasant Grove Boulevard and Foothills Boulevard have a LOS level D during peak hours, and Foothills Boulevard has a LOS level D during off-peak hours as well.

PROJECT FEATURES

The REP project includes the following features: a generating facility and switchyard at the site; a six-mile long natural gas pipeline; a 50-foot long recycled water pipeline, and a 800-foot long wastewater pipeline.

ANALYSIS AND IMPACTS

THRESHOLDS OF SIGNIFICANCE

Significance criteria are based on California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist Form (amended December 1, 1999), and on performance standards or thresholds established by responsible agencies.

An impact may be considered significant if the project results in:

- an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- a level of service standard established by the county congestion management agency for designated roads or highways, is exceeded either individually or cumulatively;
- a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- a substantial increase in hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- inadequate emergency access;
- inadequate parking capacity; or
- a significant hazard to the public or the environment through the transportation of hazardous material.

CONSISTENCY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Public Resources Code section 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the [Energy] commission determines that such a facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity. In making the determination, the Commission shall consider the entire record of the proceeding, including, but not limited to the impacts of the facility on the

environment, consumer benefits, and electric system reliability." In no event shall the Commission make any finding in conflict with applicable federal law or regulation. When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (Pub. Resources Code § 25523(d)(1)). The traffic and transportation laws, ordinances, regulations, standards (LORS), and policies applicable to the project have been analyzed in the Impacts section below to determine the extent to which the REP is consistent or at variance with each requirement or standard.

IMPACTS

The following discussion identifies potential traffic impacts associated with the construction of the REP, and provides an explanation of the impact conclusion.

Construction Phase

Traffic impacts from the REP construction were evaluated based on daily and peak hour volumes. The peak month of construction activity was evaluated to provide a conservative (i.e. worst case) analysis. The peak period of construction is expected to occur 11 to 12 months after the start of construction.

Construction Workforce and Truck Traffic

For traffic impact analysis purposes, the applicant has assumed that construction workers in their vehicles will reach the REP site by using SR-65, Blue Oaks Boulevard, Fiddyment Road, and Phillip Road, or by using Pleasant Grove Boulevard to Fiddyment Road. Staff has also identified an additional likely route using I-80, Cirby Way, Baseline Road, Fiddyment Road, and Phillip Road. In addition, workers could arrive at the site using SR-99/70 via Baseline, Fiddyment, and Phillip Roads. Pleasant Grove Boulevard has a high level of congestion during peak commuting hours, and Foothills Boulevard has a high level of congestion all day long. Staff is recommending that Foothills be avoided altogether as a travel construction route, and Pleasant Grove will be avoided during peak commuting hours (see Condition of Certification **TRANS-1**).

The average construction workforce would be approximately 114, with a peak force of 206. The 18 to 20 month construction period is expected to last from the spring of 2005 to the fall of 2006. It is anticipated that 90 percent of the construction traffic will leave the site and head east on Phillip Road and then north on Fiddyment Road, and east on Blue Oaks Boulevard until reaching SR-65. Approximately 2 to 3 percent of the construction vehicles accessing the project site would be trucks. Blue Oaks Boulevard, Baseline and Fiddyment Roads are designated truck routes (Roseville 2003b, pg. S-55).

Traffic and Transportation Table 2 below presents a summary of the estimated vehicle (i.e. cars and trucks) trip generation for the project construction phase. Assuming that 1/3 of the workers carpool, the proposed project will generate a total of 106 daily vehicle round trips, during an average construction month. For the peak months of heaviest construction activity (i.e. months 11 & 12), the REP will generate 145 round trips. This includes both construction worker commute traffic and truck traffic. Staff believes that car-pooling should be encouraged whenever possible to minimize the number of daily vehicle trips. In addition, Condition of Certification **TRANS-1** requires

the applicant to maximize the use of daily off-peak traffic periods for the arrival and departure of construction traffic, to prevent deterioration from existing traffic conditions. Construction traffic impacts to local and regional roads will be determined by the routes used by construction workers and delivery trucks arriving and departing from the project site. Most workers and deliveries of building supplies and equipment will come from the greater Sacramento Metropolitan Area.

Traffic and Transportation Table 2
Trip Generation Summary Table – Construction Phase

Non-Peak Months
186 workers plus 26 trucks = 212 one way trips or 106 round trips
Peak Months (11 & 12)
278 workers plus 12 trucks = 290 one-way trips or 145 round trips
Adapted from REP AFC - Table 8.12-4 Notes: 1. REP assumes 1/3 of workers carpool (1.5 persons per vehicle) 2. REP assumes 80 percent of workers and 10 percent of deliveries arrive or depart during peak traffic hour 3. Staff assumes that there will be fewer trucks during the peak construction months because most of the materials and equipment will be on-site.

Railways

During construction of the REP, the applicant plans on using the Southern Pacific rail line south of the project site or the rail line along Industrial Drive east of the project (REP 2003a, pg. 2-20) as shown in **Traffic and Transportation Figure 1**. The heavy haul truck route from the Union Pacific yard in Downtown Roseville utilizes Washington Road north to Blue Oaks Boulevard, west on Blue Oaks Boulevard to Fiddyment Road, south on Fiddyment Road to Phillip Road, and west on Phillip Road to the REP site (City of Roseville 2004b).

Linear Facilities

Three related linear facilities will be constructed in conjunction with the REP: a natural gas pipeline and metering station, a recycled water line, and a wastewater discharge pipeline. **Traffic and Transportation Figure 2** shows the route of the gas pipeline. The construction of the gas and water pipelines would require deliveries of heavy equipment, construction materials and supplies, piping, concrete, rebar, miscellaneous consumables, and other construction equipment. There may be some minor impacts on adjacent roads (i.e. Phillip and Fiddyment Roads) such as temporary lane closures, detours, and traffic control procedures. Staff notes that parking will be made available on City-owned property onsite during construction of the REP (Roseville 2003a, Figure 2.2.2). Traffic implications of the linear facilities are discussed below.

Natural Gas Pipeline

Traffic and Transportation Figure 2 shows two possible routes for the natural gas pipeline. The first route is six-miles long and begins at the southwest corner of the site and would proceed east to Phillip Road and north to Blue Oaks Boulevard. It would go east on the south side of Blue Oaks Boulevard until arriving at the intersection with Fiddyment Road. The pipeline would proceed south on the western side of Fiddyment Road and would cross Baseline Road. It would proceed east along the south side of Baseline Road until it connects with an existing pipeline approximately 700 feet east of the intersection of Baseline Road and Country Club Drive. The second route would begin at the planned intersection of West Side Drive and Pleasant Grove Boulevard and would proceed north to Phillip Road before turning east to connect with the REP, for a total length of 1.5 miles.

PG&E will construct the pipeline but Roseville Electric will need to coordinate the activity to minimize adverse traffic impacts on the applicable roads. Construction of the pipeline is anticipated to take three months. Based on similar projects, it is estimated that a peak monthly workforce of approximately 12-14 employees will be required for pipeline and related facilities construction. Pipeline construction requires the use of heavy equipment including excavators (backhoe, loader, motor grader, and trencher), cranes, water trucks, and fuel trucks. Various equipment and material would be delivered by truck. There is a potential for some minor impacts on traffic using the roads along the pipeline route, such as a temporary detour, but these impacts would be less than significant. As noted earlier, staff is recommending in Condition of Certification **TRANS-1** that truck deliveries be made in off-peak periods.

Recycled Water Line

The 50-foot recycled water line will connect the REP and the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The PGWWTP began operation on June 29, 2004. The recycled water line will cross underneath the current alignment of Phillip Road. Construction of the recycled water line would be completed within a couple of weeks. Traffic impacts on Phillip Road will be less than significant, particularly given the short length of the water line and the low number of vehicles using this section of the road.

Wastewater Discharge Pipeline

A new 800-foot waste water pipeline would be installed next to Phillip Road, from the REP site to the existing effluent junction at the PGWWTP. Staff expects the construction of the waste water discharge pipe would be completed within one to two months. There may be some traffic impacts on vehicles using Phillip Road similar to those identified in the discussion above on constructing the gas pipeline, but they will be less than significant.

Changes to Level of Service

The combination of commute, truck, and visitor traffic associated with the construction phase of the REP would increase the volume of traffic in the local area. With the project traffic measures described below, most of the roadway segments listed previously under existing conditions will remain at LOS A, with one remaining at C, as shown in the column on the right in **Traffic and Transportation Table 1**. However, Foothills

Boulevard will remain at a LOS D level until the traffic signals are synchronized and the road is enlarged to six lanes within two years (City of Roseville 2004e). Staff is recommending that construction workers and truck traffic use alternate roads such as Baseline Road and Blue Oaks Boulevard (see Condition of Certification **TRANS-1**).

Prior to plant construction, a traffic control plan (see Condition of Certification **TRANS-1**) will be developed and implemented so that traffic flow and access on local roads and intersections will not seriously degrade existing traffic patterns. The traffic control plan will outline what measures will need to be taken on a month-to-month basis, given the expected construction traffic volumes. The construction contractor will be required to prepare this plan to address timing of heavy equipment and building materials deliveries; an employee ridesharing/trip reduction plan; and signing, lighting, and traffic control device placement.

Best management practices will be incorporated in the construction traffic control plan, including:

- truck loads will not exceed legal limits;
- loads of material (i.e. excavated soil) will be centered in the cargo bed and either enclosed by vehicle covers or wetted to prevent wind from blowing materials out of the truck;
- trucks and trailers will be swept cleaned or hosed after unloading and before entering highway;
- mufflers, brakes, and all loose items on trucks will be maintained to minimize noise and ensure safe operation; and
- truck operations will be kept to quietest operating speeds. Drivers will be advised to avoid downshifting during vehicle operations through residential communities.

REP construction traffic could be easily accommodated on the various routes discussed earlier. Therefore, they will not be affected significantly.

Roadway Size and Weight Limits

Occasional transportation of large project components such as the generator turbines may exceed the load size and weight limits of regional and local roadways. Oversize and/or overweight loads will require Overload Limit Permits from Caltrans. Mitigation measures and a condition of certification (see Condition of Certification **TRANS-2**) that ensure compliance are discussed later in the Conditions section of this analysis.

OPERATIONAL PHASE

Workforce and Visitor Traffic

The operation of the REP would require a labor force of approximately 25 full-time employees with a maximum of 35 round-trips per day. This includes 25 round-trips by employees and 10 round-trips by trades people, vendors, consultants, and City of Roseville management personnel (Roseville 2003a, pg. 8.12-16). The existing highways and streets can easily accommodate this increase. No significant long-term

traffic impacts are expected as a result of the REP's operational workforce and visitor traffic.

Truck Traffic

During operation of the REP, trucks would periodically deliver/pickup replacement parts, lubricants, aqueous ammonia, sulfuric acid, refuse, and various disposable goods. On average there would be three truck deliveries (round trips) to the project site per day (Roseville 2003a, pg. 8.12-16). The anticipated travel route for materials delivery is the Blue Oaks Boulevard, Fiddyment and Phillip Roads route.

The existing highway and roadway system would not be significantly affected by the increase in truck traffic associated with the operation of the REP. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with Federal and State standards established to regulate the transportation of hazardous substances. Mitigation measures and conditions of certification that ensure this compliance are discussed later in this analysis.

Change in Air Traffic Patterns

The Lincoln Airport, which is located 10 miles north, is the closest airport to the REP site. As noted above in the LORS and setting descriptions, the Federal Aviation Administration (FAA) Regulations, Part 77 establishes standards for determining if a structure could endanger airport operations. Since the REP is outside the Lincoln Airport control zone, the applicant is not required to file FAA Form 7460-1. Similarly, a avigation easement from the Placer County Airport Land Use Commission (PCALUC) is not required. In addition, staff believes that plumes generated by the REP would not create an aviation safety hazard, and the REP will not result in a change in air traffic patterns, or constitute any hazard to air traffic safety.

Hazards Posed by Design Feature or Incompatible Use

As noted in the Preliminary Staff Assessment, staff identified a potential traffic hazard posed by cooling tower plumes that could form ground fog and significantly reduce visibility for motorists using Phillip Road (see **Traffic and Transportation Figure 3**). After conducting a cooling tower plume ground fogging analysis, staff determined that there is a potential for ground fogging to occur approximately 10 to 15 hours per year during winter (Aspen 2004b). The fog would be opaque, observable (U.S. Department of Commerce 1984), and could occur anywhere within 4,000 feet of the cooling towers (Aspen 2004b). This could significantly reduce visibility and increase the chance of a traffic accident. Staff has contacted the Chief of Engineering with Caltrans District 3, and another engineer with Fehr & Peers, a local traffic and transportation consulting firm, about the potential adverse traffic impact from the ground fogging plumes. Both traffic engineers said there would be potential adverse traffic safety impacts on local roads near the REP (Caltrans 2004, Fehr & Peers 2004b). The Fehr & Peers traffic engineer believes that any fogging event that lasts at least 15 minutes is a significant adverse impact (Fehr and Peers 2004b). However, both the Caltrans engineer and staff contend that a fogging event of only a few minutes would also affect local motorists, depending on the time of day and weather conditions.

Staff believes the fog would significantly reduce visibility and adversely affect traffic safety on Phillip Road. Based on staff's ground fog modeling, this fogging impact would also affect vehicles using Blue Oaks Boulevard after it is extended to the west, as envisioned by the WRSP development. City of Roseville staff expects that Blue Oaks Boulevard will be extended to Phillip Road by 2008. City staff has also notified Commission staff that subdivision maps have been submitted for building over 2,000 residences west of Fiddyment Road within a couple of years. Vehicle drivers associated with the increased traffic from the new development could be adversely impacted by cooling tower generated ground fog.

Days in winter when the cooling tower generated ground fog would occur (i.e. twenty-five miles per hour (MPH) wind), would be in addition to days when the more common tule fog will form under different conditions (i.e. less than five MPH wind), and would thereby increase the number of days when fogging conditions would impact traffic safety on local roads.

In addition, the Director of Facilities Development for the Roseville Joint Union School District (District) has contacted staff and expressed concern about the fog related to the cooling tower plume, and the potential impact on motorists traveling to and from a planned high school near Phillip Road and other planned streets. The high school site is located approximately 2300 feet from the REP site. The District plans to open the school by 2010 and estimates that two-thirds of the high school students (2200-2500) will either drive to school or be driven by parents or friends. This would add an additional 1452 to 1650 round-trip vehicle trips (.66 multiplied by 2200 and 2500 respectively) during the morning peak traffic period. The morning commute may occur during the time when the cooling tower plumes could generate ground fog. Although fog is not a criteria air pollutant or a toxic air contaminant, the District considers cooling tower induced ground fog a potential safety hazard, particularly for young inexperienced drivers (Roseville Joint Union School District 2004). Based on the number of hours that the ground fog could occur annually (primarily in winter), the potential duration of the fog event, and the increased traffic on local roads (including the motorists driving to and from the high school), staff shares the concerns raised by the School District and has proposed appropriate mitigation.

Commission staff is proposing Condition of Certification **TRANS-7** that requires the cooling towers be built with plume abatement technology. The purpose of the plume abatement technology would be to significantly reduce, if not eliminate, the potential for any ground fogging traffic safety impacts from the REP cooling towers. The traffic engineers staff contacted advised that, in this situation with a high school in close proximity, the installation of plume abatement technology was the preferred option to ensure the safety of motorists (Caltrans 2004, Fehr & Peers 2004b). The estimated cost for the installation of plume abatement technology is $1.3 million more than the cost of a standard cooling tower without a plume abatement mechanism (Aspen 2004a). However, the increased cost must be balanced against the potential for a serious injury during one or more traffic accidents.

Staff also considered the wastewater treatment plant in its ground fogging modeling analysis, which concludes that the two phenomena (i.e. ground fogging from the cooling towers and steam from the ponds at the treatment plant) are unlikely to coincide. This

conclusion is discussed in **Attachment A**; A Cooling Tower Plume Ground Level Fogging Analysis.

Emergency Access

Emergency vehicles would enter through the plant's main entrance on Phillip Road or a secondary entrance on the eastern side of the project site. All of the surrounding roadways currently operate and should continue to operate at LOS A or B. Emergency vehicles such as fire trucks and ambulances could approach the site from the east via Blue Oaks Boulevard and Fiddyment Road, and from the south via Baseline and Fiddyment Roads. The closest fire station is Fire Station #5 located at 1567 Pleasant Grove Boulevard approximately 3.8 miles form the REP (REP 2003a, pg. 2-23). Staff believes that an eight to ten minute emergency response time is a reasonable estimate. The nearest medical facility is the Sutter Roseville Medical Center located at One Medical Plaza, about nine miles east of the project site, with a response time of about twenty minutes (Roseville 2003a, pg. 8.10-6). Medical evacuation by helicopter from UC Davis Medical Center on Stockton Boulevard in Sacramento would have an approximately fifteen minute response time. Staff has concluded that the REP would not affect or constrain emergency access; therefore, no impact is expected.

Parking

The applicant has stated that all parking needs for the construction workforce and construction related trucks will be provided onsite in an area west of the power plant footprint, in a space approximately 600 feet by 250 feet [150,000 sq. ft.] (Roseville 2003, pg. 2-1, Figure 2.2-2). Staff believes that this space will be adequate.

Transportation of Hazardous Material

Operation of the REP will involve hazardous materials and waste including lubricants, aqueous ammonia, and sulfuric acid. Licensed hazardous waste transporters will access the REP via SR-65, Blue Oaks Boulevard, and Fiddyment and Phillip Roads.

The transportation and handling of hazardous substances associated with the REP can increase roadway hazard potential. The handling and disposal of hazardous substances are addressed in the **WASTE MANAGEMENT** and the **HAZARDOUS MATERIALS MANAGEMENT** sections of this Staff Assessment. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate the transportation of hazardous substances. Condition of Certification **TRANS-4** addresses compliance with these regulations.

The State Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous spills.

The California Vehicle Code and the Streets and Highways Code are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the

jurisdiction of the California Highway Patrol. For an in-depth description of the amount and type of hazardous materials that would be used during the construction of the facility, see the **WASTE MANAGEMENT** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this Staff Assessment.

CUMULATIVE IMPACTS

The REP is within the West Roseville Specific Plan (WRSP) area that will be undergoing substantial residential, commercial, and other development on a 3,162 acre parcel of land. The WRSP is discussed in detail in the **LAND USE** portion of this Staff Assessment. Initial earth moving activities related to WRSP development may begin in the spring of 2005. Construction of the REP is scheduled to start during the same time period.

Part of the WRSP development will entail a number of improvements and realignments of existing roads as well as construction of new roads. Some of these improvements will occur on roads that will be utilized by REP construction workers. The section of Blue Oaks Boulevard between Crocker Ranch Road and Fiddyment Road will be expanded to six lanes in 2006. The section of Fiddyment Road between Blue Oaks Boulevard and Pleasant Grove Boulevard will be enlarged to four lanes sometime between 2004 and 2006. The portion of Phillip Road that currently provides access to the REP site will become a private road after the construction of new roads in the West Roseville area. This will occur in 2007 or 2008.

Construction of the REP is scheduled to start in the spring of 2005 and conclude in the fall of 2006. Therefore, there may be some overlap with the road improvements noted above. City of Roseville Public Works Department staff has advised staff that traffic flow will not be significantly impaired during the time when the road improvements are scheduled to take place. Staff concurs with this conclusion. In addition, the increased traffic generated by the REP project's construction during the same period will not have an adverse impact on the levels of service for the applicable roads (City of Roseville 2004c). The amount of traffic generation will diminish dramatically between the construction and operational phases and will not contribute significantly to background traffic.

Staff has analyzed the possibility of intermittent ground fog (primarily during winter on windy days) resulting from cooling tower plumes on certain days, in addition to winter tule fog conditions on other days. This could create a larger number of days when there are hazardous traffic safety conditions. Staff considers this a potentially adverse cumulative impact. This plume related ground fog issue is addressed in detail in the Hazards Posed by a Design Feature section earlier in the Impacts section.

FACILITY CLOSURE

The planned life of the generation facility is 30 years. Facility closure requirements are discussed in detail in the general conditions section of this Staff Assessment. At least 12 months prior to the proposed decommissioning, the applicant shall prepare a Closure Plan for submission to the Energy Commission for review and action. At the

time of closure all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with. The effects of the REP closure on traffic and transportation would be similar to those discussed for the project itself. Closure would create traffic levels that are similar in intensity and duration to those expected during facility construction. The removal of waste and other materials would produce impacts from truck traffic.

MITIGATION

Staff recommends the following traffic and transportation mitigation measures:

- Prepare a construction traffic control plan with input from the City of Roseville and County Placer County and Caltrans (Condition of Certification **TRANS-1**).
- Obtain and comply with all necessary encroachment and transportation permits from Caltrans, and the City of Roseville and County Placer County, and other jurisdictions regarding the transportation of heavy equipment and hazardous materials and any construction activity within the public right-of-way (Conditions of Certification **TRANS-2, 3 & 4**).
- Enforce a policy that all project-related parking occurs in designated parking areas on the REP site (Condition of Certification **TRANS-5**).
- Repair any damage to Phillip and Fiddyment Roads, Pleasant Grove and Blue Oaks Boulevards, Baseline Road or other impacted roadway incurred during REP construction to the roads' pre-project construction condition (Condition of Certification **TRANS-6**).
- The cooling towers will be constructed with plume abatement technology which can significantly reduce, if not eliminate, cooling tower plumes and the related potential for ground fogging (Condition of Certification **TRANS-7**).

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all federal, state and local LORS. Staff has recommended conditions of certification that will ensure compliance with identified federal, state, and local LORS, including the existing Placer County General Plan, the City of Roseville Transportation Element of the Comprehensive General Plan, and the West Roseville Specific Plan.

RESPONSE TO PUBLIC COMMENTS

The City of Roseville submitted a letter to the Commission, dated August 11, 2004, entitled *Roseville Electric's Comments on the Preliminary Staff Assessment*. Suggested changes in some of the Traffic and Transportation Conditions of Certification were offered for staff's consideration. Staff agreed with one of the suggested edits and changed the time for submitting the construction traffic control plan from 60 to 45 days before the start of site mobilization (see **TRANS-1**).

In another letter dated August 18, 2004, the City of Roseville included Appendix A entitled *Major Project Permit Conditions of Approval for the Roseville Energy Park*. Conditions 1, 4, 5, 8, 15, 19, and 51 have some relation to a traffic and/or transportation issue. Condition of Certification **TRANS-1** requires the project owner to consult with the City of Roseville regarding traffic regulation matters as outlined in Appendix A.

The City of Roseville submitted a third letter dated September 29, 2004 which stated that the City does not believe the potential fogging from the REP will create a significant traffic hazard. Staff disagrees with this conclusion for the reasons stated in the Hazards Posed by a Design Feature discussion in the Impacts section and believes that mitigation is required as noted below in Traffic and Transportation Condition of Certification **TRANS-7**.

Finally, the Roseville Joint Union High School District sent staff a memorandum dated October 18, 2004 expressing concern about the potential ground fog from the REP creating a traffic safety hazard for students and others traveling to the proposed high school just east of Phillip Road. Staff acknowledges this concern and, as noted above, has proposed **TRANS-7** as appropriate mitigation.

CONCLUSIONS AND RECOMMENDATIONS

1. During the construction phase, increased roadway demand resulting from the daily movement of workers and materials will slightly increase traffic on some roads that are currently rated LOS A, but this rating will not be significantly affected.
2. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be negligible.
3. All potential impacts from the transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal, state, and local standards and permits established to regulate the transportation of hazardous substances.
4. The owner will obtain and comply with all necessary encroachment permits from Caltrans, the City of Roseville, Placer County, and all other jurisdictions related to any construction within the public right-of-way.
5. Construction activities have the potential to damage local roadways. The applicant will be required to repair damaged roadways to their original condition.
6. The applicant indicates that parking for the construction workforce will be provided at the project site. The applicant will be required to enforce a policy that all project-related parking occurs in designated parking areas; therefore, construction parking is not considered a significant project impact.
7. REP construction traffic (i.e. cars and trucks) should avoid using Foothills Boulevard, which is currently very congested without the addition of project related vehicles.
8. Intermittent ground fogging expected to result from cooling tower plumes presents a potential traffic safety hazards for area motorists that could be significant. Traffic

and Transportation **TRANS-7** describes proposed mitigation to address this potential significant hazard.

The conditions of certification proposed below are those that staff has identified as necessary to mitigate project impacts and assure compliance with LORS. If the Energy Commission certifies the REP, staff recommends that it adopt the following Conditions of Certification.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall develop a construction traffic control plan that limits peak hour construction-period truck and commute traffic in coordination with the City of Roseville Public Works Department. The project owner shall also consult with Placer County, Caltrans, and the City of Roseville staff dealing with traffic regulation enforcement, as outlined in Appendix A of a letter from the City of Roseville, dated August 18, 2004 (see the **General Conditions** of this FSA). Specifically, the overall traffic control plan shall include the following:

- Require the primary contractor and major subcontractors to advise workers develop and implement a construction employee carpool program, and to avoid using Foothills Boulevard;
- Through worker education and shift scheduling, maximize worker commute trips during off-peak hours (off-peak hours are (1) before 7:00 AM; (2) between 9:00 AM and 4:00 PM; and (3) after 6:00 PM or other hours as agreed to by the CPM;
- Schedule heavy vehicle equipment and building material deliveries as well as the movement of materials and equipment to the site, including the adjacent lay-down area to occur during off-peak hours; and

The construction traffic control plan shall also include the following restrictions on construction traffic addressing the following issues for linear facilities:

- Timing of water and gas pipeline construction shall ensure that all pipeline construction affecting local roads shall take place outside the peak traffic periods to avoid traffic flow disruptions, or other hours as agreed to by the CPM;
- Signing, lighting, and traffic control device placement;
- Temporary travel lane closures and potential need for flagmen;
- Maintaining access to adjacent residential and commercial properties; and
- Emergency access.

Verification: At least 45 days prior to start of site mobilization, the project owner shall provide to Placer County, the City of Roseville, and the California Highway Patrol for review and comment, and to the CPM for review and approval, a copy of its construction traffic control plan.

TRANS-2 The project owner shall comply with California Department of Transportation (Caltrans) and other affected jurisdictions' limitations on vehicle sizes and weights. In addition, the project owner or their contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

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

TRANS-3 The project owner shall ensure compliance with Caltrans and other relevant jurisdictions' limitations for encroachment into public rights-of-way, and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

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

TRANS-4 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of all hazardous materials, and that all federal and state regulations for the transport of hazardous materials are observed.

Verification: The project owner shall include in its Monthly Compliance Reports during construction and Annual Compliance Reports during operations copies of all permits and licenses acquired by the project owner concerning the transport of hazardous materials.

TRANS-5 Prior to the construction of the power plant and all related facilities, the project owner shall develop a parking and staging plan for all phases of project construction, to enforce a policy that all project related parking occurs onsite.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the plan to the City of Roseville Public Works staff for review and comment, and to the CPM for review and approval. The material submitted to the CPM shall include documentation of the City's review and comments. Monthly Compliance Reports submitted to the CPM shall describe the project owner's actions to ensure that this condition is being met.

TRANS-6 Prior to the beginning of site mobilization activities, the project owner shall prepare a road mitigation plan for any roads affected by oversize or overweight vehicles and underground pipeline construction to the City of Roseville Public Works Department, and the CPM. The intent of this plan is to ensure that any roads affected by oversize or overweight vehicles and underground pipeline construction will be repaired and reconstructed to original or as near original condition as possible. This plan shall:

- Document the pre-construction condition of the affected roads in the region of the site (i.e., Phillip Road and Fiddyment Road) and those along a pipeline route (i.e., Phillip Road, Blue Oaks Boulevard, Fiddyment Road, Baseline Road). Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape of the affected roads.
- Document any portions of roads that may be inadequate to accommodate oversize or large construction vehicles, and complete remediation measures that are necessary;
- Provide appropriate bonding or other assurances to ensure that any damage to a road due to construction activity will be remedied by the project owner;
- Relocate utility poles if necessary, to insure that adequate clear zones are established along the property frontage; and
- Reconstruct portions of roads that are affected by project construction including the use of oversize or overweight construction vehicles, and the installation of underground utilities.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a road mitigation plan focused on restoring the roads to their pre-project condition to Placer County and the City of Roseville for review and comment, and to the CPM for review and approval.

At least 90 days prior to the start of pipeline construction, the project owner shall submit a separate road mitigation plan to the City of Roseville Public Works Department for review and comment and to the CPM for review and approval at least 30 days prior to the start of site mobilization.

Within 90 days following the completion of construction, the project owner shall provide photo/videotape documentation to the City of Roseville Public Works Department, and the CPM that the affected roads have been restored to their pre-project condition, consistent with local LORS.

TRANS-7 The project owner shall design and construct the cooling towers using plume abatement technology with a dry-cooling section that has a stipulated plume abatement design point of 45 degrees Fahrenheit and 80 percent relative humidity. An automated control system will be used to ensure that the abatement system is operating so that ground fogging plumes do not occur beyond the property fence line.

Verification: At least 60 days prior to construction of the cooling tower, the project owner shall provide to the City of Roseville Public Works Department for review and comment, and to the CPM for review and approval, the specifications for the automated control systems and related systems and sensors that will be used to ensure that the cooling tower design will meet the abatement design point. In addition, the specifications must describe the systems to be put in place to ensure that the plume abatement technology will eliminate the potential for ground fogging plumes to occur beyond the project fence line. The material submitted to the CPM shall include a copy of the letter accompanying the analysis transmittal to the City.

REFERENCES

Aspen Environmental Group 2004a. E-mail from William Walters, Aspen Environmental Group, to Eric Knight, California Energy Commission, dated June 1, 2004.

Aspen Environmental Group 2004b. E-mail from William Walters to James Adams, California Energy Commission, dated August 5, 2004.

Aspen Environmental Group 2004c. E-mail from William Walters to James Adams on October 20, 2004.

Caltrans 2004a. Personal communication between Brian Simi, Chief, Office of Electrical Systems, Caltrans – District 3, and James Adams on November 4, 2004.

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TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

INTRODUCTION

The electrical energy from the proposed Roseville Electric (RE) power facility (Roseville Energy Park or REP), would be delivered to the City of Roseville's transmission grid through a new double-circuit 60 kV overhead line to be built by RE under the City's West Roseville Specific Plan (WRSP). The connection to the WRSP-related line would be through a new switchyard to be built at the REP site. The applicant, RE, would design, build, and maintain the connection line according to standards and practices currently applied to its existing utility lines. Since the WRSP-related 60 kV line would be located within the RE service area, it would be designed, built, and operated according to these same RE standards and practices (Roseville 2003a, pp. 1-2, and 6-10 through 6-12).

The purpose of this staff analysis is to assess the proposed interconnection line's construction and operation plan for incorporation of the measures necessary to minimize the related field and non-field impacts whose reduction remains the focus of the current laws, ordinances, regulations, and standards (LORS). If such compliance were established, staff would recommend approval with respect to the issues of concern in this analysis; if not, staff would recommend revisions as appropriate. Staff's analysis focuses on the following issues as related primarily to the physical presence of the lines, or secondarily, to the physical interactions of their electric and magnetic fields:

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

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead transmission lines as proposed to connect the proposed REP with the WRSP-related 60 kV line. The potential for these impacts is assessed in terms of compliance with specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit the impacts noted above. However, many local jurisdictions require such lines to be located underground in new housing developments because of the potential for visual impacts on the landscape. Such requirements are not related to the concern over health effects.

AVIATION SAFETY

Any potential hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS, as discussed below, are intended to ensure the distance and visibility necessary to prevent such collisions.

Federal

- Title 14, Part 77 of the Federal Code of Regulations (CFR), "Objects Affecting the Navigation Space." Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid the aviation hazards of concern.
- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that May Affect the Navigation Space." This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting." This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines.

Electric fields are unable to penetrate most materials, including the soil, therefore, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for perception could be assessed from considering the field strength estimates obtained for the line. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

Federal

- Federal Communications Commission (FCC) regulations are specified in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff recommends specific conditions of certification as necessary to ensure compliance with this FCC requirement.

State

- California Public Utilities Commission (CPUC), General Order 52 (GO-52), governs the construction and operation of power and communications lines to prevent or mitigate inductive interference.

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

AUDIBLE NOISE

Industry Standards

There are no design-specific federal or state regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency maintainability and reliability. All modern overhead high-voltage lines are designed to assure compliance with such noise limits. As with radio-frequency noise, such audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from those of less than 345 kV as proposed for REP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-ft right-of-way.

FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

State

- CPUC, General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” specifies tree-trimming criteria to minimize the potential for power line-related fires.

- Title 14, California Code of Regulations, Section 1250: “Fire Prevention Standards for Electric Utilities” specifies utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks addressed by the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

State

- CPUC, GO-95, “Rules for Overhead Line Construction,” specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements ensures the safety of the general public and line workers.
- Title 8, California Code of Regulations, Section 2700 et seq.: “High Voltage Electric Safety Orders,” establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

NUISANCE SHOCKS

Industry Standards

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). As with the proposed overhead lines, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff recommends specific conditions of certification as necessary to ensure that such grounding is made along the proposed route.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend reduction of such fields as feasible without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Utilities, such as Roseville Energy, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such

field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, its fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed REP connection line according to existing RE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management. Staff recommends a specific condition of certification (**TLSN-1**) to ensure implementation of the design measures necessary.

Industrial Standards

There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York, Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because only it can penetrate soil, building and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines are lower level, but long-term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

SETTING

According to information from the applicant (Roseville 2003a, pp. 1-1, 6-1, 6-2, 8.6-1 through 8.6-8, and pp. 8.6-13 and 8.6-14), the proposed REP would be located on a 12-acre site within a 40-acre land parcel owned by the City of Roseville. The site is adjacent to and north of the Pleasant Grove Wastewater Treatment Plant in an area currently utilized for agricultural grazing and with only a few rural residences the nearest of which is 850 feet to the northwest. While the area to the south, east, and west are proposed for residential, industrial and commercial development under the West Roseville Specific Plan, there would be no residences in the immediate vicinity of the proposed REP and interconnection line, as well as the WRSP-related 60 kV transmission line to which it will be interconnected. The proposed connecting line would be approximately 100 feet long and located entirely within REP's property boundaries, meaning that the residential magnetic field exposure at the root of the present health concern would be insignificant for this project line. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in transit under the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern. The same lack of nearby residences means that the previously noted electric field-related communication impacts would be unlikely from operations.

PROJECT DESCRIPTION

The proposed REP line will consist of the segments listed below:

- One double-circuit overhead 60 kV line extending approximately 100 feet from the project's 60 kV switchyard to the connection point on the WRSP-related 60 kV line extending to RE's Fiddyment Receiving Station approximately 4 miles to the south; and
- The project's on-site 60 kV switchyard.

The interconnection scheme would constitute a looping of the interconnected line from the point of connection to the WRSP-related line, into the new on-site project 60 kV switchyard. The basic configuration of the line's support structures was provided by the applicant as relevant to safety, efficiency, reliability, and field cancellation effectiveness.

Since the proposed interconnection line would be designed and operated according to standard RE practices, its design-driven field strengths (and, therefore, potential contribution to existing area field levels) should be at the same level expected for RE lines of the same voltage and current-carrying capacity. Staff recommends a specific condition of certification (**TLSN-2**) to provide the data necessary for the required compliance assessment.

PROJECT SPECIFIC IMPACTS

Aviation Safety

As noted by the applicant (Roseville 2003a, p. 6-9) the structural support for the proposed line would (at less than 70 feet tall) be significantly shorter than the 200 feet regarded by the FAA as triggering the concern about aviation safety. Furthermore, the line would be located within REP's property boundaries in an area with existing lines of higher voltage and no nearby airports or heliports. Given these conditions, staff considers the proposed interconnection line as unlikely to pose a significant obstruction-related aviation hazard to utilizing aircraft as defined using current FAA criteria. Therefore, no FAA "Notice of Construction or Alteration" would be required.

Interference with Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. The proposed lines would be built and maintained according to standard RE practices, minimizing such surface irregularities and discontinuities (Roseville 2003a, p. 6-9). Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not the proposed 60 kV, even in rainy weather when the presence of raindrops increases the strengths of the offending surface electric fields. The intended low-corona design would be the same as used for exiting RE lines of similar voltage rating. Since these existing lines do not currently produce the corona effects of specific concern, staff does not expect any corona-related radio-frequency interference in the area around the line. Moreover, the line would be located within the REP property lines in an area without residences making it unnecessary to recommend a specific condition on the issue of residential radio or television signal interference.

Audible Noise

As happens with radio noise, the low-corona design to be used for the proposed REP lines would serve to minimize the potential for corona-related audible noise. This means, as noted by the applicant (Roseville 2003a, p. 6-8), that the proposed line operation would be unlikely to add significantly to current background noise levels in the project area. For an assessment of the noise from all phases of the proposed project and related facilities, please refer to staff's analysis in the **Noise and Vibration** section of this Preliminary Staff Assessment.

Fire Hazards

Standard fire prevention and suppression measures for all RE lines would be implemented for the proposed interconnection line (Roseville 2003a, p. 6-9). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach. Moreover, the line would be located within REP's property lines without the trees that could pose a fire hazard from line contact.

Hazardous Shocks

The applicant's stated intention to implement the GO-95- related measures against direct contact with the energized line (Roseville 2003a, pp. 6-7, 6-8 and 6-10) 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

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (Roseville 2003a, pp. 6-8 and 6-9). Staff recommends Condition of Certification **TLSN-2** to ensure such grounding.

Electric and magnetic field exposure

As noted by the applicant (Roseville 2003a, p. 6-7), specific field strength-reducing measures would be incorporated into the proposed connecting line design to ensure the field strength minimization currently required by CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

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 interacting of conductor fields.

Connecting the proposed REP line to the WRSP-related line of the same voltage would not change the existing voltages within the area transmission grid. Staff recommends specific field strength measurements in Condition of Certification **TLSN-3** to verify that the REP-related voltage would not change the existing electric fields without significant changes to the applied voltage. These measurements would also allow for comparison with electric fields from RE lines of the same design and voltage. The recommendation for magnetic field strength measurements would allow for comparison with magnetic fields from RE lines of the same design and current-carrying capacity as well as those from similar lines in the few states with specific limits on line magnetic fields. These magnetic field strength limits vary from 150 to 250 mG established (depending on voltage level) for the edges of the rights-of-way.

Since optimum field-reducing measures have been incorporated into the proposed line design, staff considers further mitigation to be unnecessary at this point, but would seek to validate the applicant's assumed reduction efficiency from the recommended field strength measurements.

CUMULATIVE IMPACTS

Since the proposed REP-related transmission lines would be designed according to applicable field-reducing RE guidelines (as currently required by the CPUC for effective

field management), staff expects the resulting fields to be similar in intensity to fields from RE lines of the similar voltage and current-carrying capacity. Any contribution to cumulative area exposures would be at similar levels. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-3**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility, which for REP is Roseville Electric. Since the proposed connection lines would be designed according to the requirements of GO 95, GO 52, and Title 8, Section 2700 et seq. of the California Code of Regulations and operated and maintained according to current Roseville Electric guidelines on line safety and field strength management, staff considers the presented design and operational plan to be in compliance with the health and safety LORS of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO COMMENTS

The applicant, in its August 11, 2004 comments on the Preliminary Staff Assessment, suggested specific modifications to the Proposed Conditions of Certification, **TLSN-1** (See the revised **TLSN-1**).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead and underground lines, the public health significance of any REP-related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant for the proposed interconnection lines given the general absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for RE lines of similar designs and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current RE guidelines (reflecting standard industry practices). These field-reducing measures would maintain

the generated fields within levels not associated with radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, should be adequate to minimize any fire hazards. Since there are no major airports or aviation centers in the immediate project area, staff does not expect the proposed line to pose a significant aviation hazard. The use of low-corona line design, together with appropriate corona-minimizing construction practices, minimizes the potential for corona noise and its related interference with radio-frequency communication in the area around the proposed route.

RECOMMENDATIONS

Since the interconnecting REP 60 kV line would be designed to minimize the safety and nuisance impacts of specific concern to staff, and located at a site with no nearby residences, staff does not recommend further mitigation and recommends approval of the proposed design and operational plan. If such approval is granted, staff recommends that the Energy Commission adopt the conditions of certification specified below to ensure implementation of the measures necessary to achieve the field reduction and line safety assumed by the applicant.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall provide specific evidence that the proposed interconnection transmission line will be designed and constructed by Roseville Electric according to the requirements of CPUC's GO-95, GO-52, Title 8, Section 2700 et seq. of the California Code of Regulations and RE's EMF reduction guidelines arising from CPUC Decision 93-11-013.

Verification: At least 30 days before starting construction of RE's transmission lines or related structures and facilities, the project owner shall submit to the CPM a letter from Roseville Electric affirming that the overhead section of the proposed REP line will be constructed according to the requirements of GO-95, GO-52, Title 8, Section 2700 et seq. of the California Code of Regulations, and RE's EMF-reduction guidelines arising from CPUC Decision 93-11-013.

TLSN-2 The project owner shall provide specific evidence that all metallic objects along the route of the overhead section will be grounded according to RE's practices.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming potential compliance with the specified grounding requirements.

TLSN-3 The project owner shall provide the results of the electric and magnetic field measurements for the proposed REP line (as made according to IEEE measurement protocols) before and after it is energized. Measurements shall be made at representative points (along the line's on-site location) as necessary to identify the maximum field exposures possible during REP operations.

Verification: The project owner shall submit the field measurement results to the CPM within 60 days of completion.

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VISUAL RESOURCES

Testimony of Eric Knight

INTRODUCTION

Visual resources are the natural and man-made features of the environment that can be viewed. This analysis focuses on whether construction and operation of the Roseville Energy Park (REP) project would cause significant impacts to visual resources in the vicinity of the project, and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS). This analysis complies with the California Environmental Quality Act (CEQA), which requires that government agencies make a determination of the potential for visual impacts resulting from a proposed project.

ORGANIZATION OF ANALYSIS

This analysis is organized as follows:

- description of analysis methodology;
- description of applicable LORS;
- description of the project aspects that may have the potential for significant visual impacts;
- assessment of the visual setting of the proposed power plant site and linear facility routes;
- evaluation of the visual impacts of the proposed project on the existing setting;
- evaluation of the project's compliance with applicable LORS;
- identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and/or to achieve compliance with applicable LORS; and
- conclusions and recommendations.

ANALYSIS METHODOLOGY

Visual resources analysis has an inherently subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

Significance Criteria

Energy Commission staff considered the following criteria in determining whether a visual impact would be significant.

The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including...objects of historic or aesthetic significance" (Cal. Code Regs., tit.14, § 15382).

Appendix G of the CEQA Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant.

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Evaluation Process

Staff first examined the planning documents, such as General Plans and Specific Plans, applicable to the project area to gain insight as to the type of land uses intended for the area, and the guidelines given for the protection or preservation of visual resources. Staff then considered the existing visual setting within the project viewshed, which is defined as the geographical area in which the project can be seen. Staff estimated the visual changes that the project would cause to determine impact significance, following the four CEQA Guidelines checklist questions listed above. Please refer to **Appendix VR-1** at the end of this section of the Final Staff Assessment (FSA) for a more complete description of staff's Visual Resources evaluation process.

Staff examined potential project impacts using a Key Observation Point (KOP) analysis, among other tools and information sources. KOPs were selected to be representative of the most sensitive locations from which the project would be seen, but they are not the only locations that staff considered in each view area. Before Roseville Electric (RE, or "applicant") filed its Application for Certification (AFC), staff visited the project area with RE's consultants for the purpose of selecting the KOPs. Two KOPs were selected for analysis: one to represent the view of local residents living very near the REP site, and another to represent the view of motorists traveling north and some residents living along Fiddyment Road, about 1.25 miles southeast of the project site. Existing condition photographs, and visual simulations of those same views after project development, were prepared for each KOP.

Once all potential impacts are examined, staff makes the determination as to whether any impacts reach a significant level and thus require mitigation beyond that proposed by the applicant. Any required mitigation must be specific to an identified impact, and must be feasible.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

The proposed project is not located on federally administered public lands and therefore is not subject to federal regulations pertaining to visual resources.

STATE

There are no State Scenic Highways within the project viewshed. Therefore, no state regulations pertaining to scenic resources are applicable to the project.

LOCAL

The proposed power plant and associated linear facilities (recycled water and natural gas supply pipelines, sanitary sewer pipeline, and storm water outfall) would be located within the City of Roseville. Therefore, the project would be subject to local LORS pertaining to the protection and maintenance of visual resources, which are found in the City of Roseville General Plan and Community Development Guidelines. The project's consistency with specific local goals, policies and guidelines pertaining to visual resources is discussed later in this analysis.

PROJECT DESCRIPTION

The following section describes the aspects of the proposed project that may have the potential to cause adverse impacts to visual resources. Please refer to the **PROJECT DESCRIPTON** section of the FSA for a more complete discussion of project details.

POWER PLANT

The proposed power plant would be situated within a 40-acre property located on Phillip Road immediately north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The power plant and associated electrical switchyard would occupy approximately nine acres of this property. The major visible components of the power plant would include the two 120-foot tall heat recovery steam generator (HRSG) exhaust stacks, the two 53-foot tall and 93-foot long HRSG units, the two 35-foot tall (including the inlet air filters) and 57-foot long gas combustion turbine generators, a 45-foot tall steam turbine generator (including pedestal), and a 44-foot tall and 193-foot long four-cell cooling tower (Roseville 2003a). The project would also include an on-site zero liquid discharge (ZLD) system to process industrial wastewater. The most prominent features of the ZLD system are the two 80-foot tall brine concentrator stacks and the two 70-foot tall crystallizer stacks. The dimensions of the major components of the power plant structures are provided in AFC Tables 8.13-2 and 8.13-4.

The combustion turbines and generator housing, the HRSGs and exhaust stacks, and the cooling tower are proposed to be painted or treated in neutral gray colors to blend in with the sky. The switchyard structures would be galvanized metal to blend with the sky and the color of the power plant structures. The various buildings at the REP site – the administration/control building, warehouse/maintenance building, water treatment building, plant electrical building, and chemical feed building – are proposed to have off-white colored walls and light tan roofs to complement the major power plant structures and to blend with the golden colors of the surrounding grasslands (Roseville 2003a). The large storage tanks – the fire water, demineralized water, and cooling tower water blowdown storage tanks – would be grouped together and are proposed to be painted neutral gray colors. An eight-foot high chain-link fence would surround the power plant site.

LINEAR FACILITIES

The REP would connect with a future 60 kV double-circuit transmission line along Phillip Road that was permitted as part of the West Roseville Specific Plan (WRSP). The City of Roseville approved the WRSP in February 2004. The REP switchyard would be connected to this 60 kV transmission line via connector lines about 100 feet long and confined to the REP site (Roseville 2003a).

Natural gas would be delivered via one of two pipeline routes. Alternative Route A would originate at an existing PG&E gas distribution line near the corner of Baseline Road and Country Club Drive. This pipeline route would be about 6 miles long and would be as follows: west on Baseline Road, then north on Fiddyment Road, then west along the future extension of Blue Oaks Boulevard (to be built as part of the WRSP), then south along the future alignment of Phillip Road (also to be built as part of the WRSP), and finally west on existing Phillip Road to the REP site where the pipeline would terminate at a gas metering station to be constructed in the southeast corner of the site. Alternative Route D would originate at a future PG&E gas distribution feeder main to be built near the corner of future Pleasant Grove Boulevard and future West Side Drive, both to be built as part of the WRSP. The line would travel north from Pleasant Grove Boulevard, first running along West Side Drive for about 1500 feet and then running within a utility easement to Phillip Road, where it would turn east to terminate at the REP site. Route D is about 1.5 miles long.

The REP would require construction of several other underground pipelines. A recycled water pipeline would be constructed underneath Phillip Road to deliver cooling water from the PGWWTP to the REP. A sanitary sewer pipeline would be built along Phillip Road to the PGWWTP influent junction structure about 800 feet east of the site. A storm water outfall would run east to northeast for about 340 feet to an unnamed tributary to Pleasant Grove Creek. The western portion of the outfall would be an underground pipeline and the eastern portion would be an open ditch.

CONSTRUCTION LAYDOWN AREAS

Construction of the proposed power plant and associated facilities would cause temporary visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. An area immediately east of the REP site would be used for temporary construction offices and for construction worker parking. An area southwest of the REP site and adjacent to the PGWWTP property would be used for temporary storage of construction equipment and materials. Construction of the power plant is expected to last for 18 to 20 months.

EXISTING SETTING

REGIONAL SETTING

The regional setting of the project is a transitional zone between the flat, open terrain of the Central Valley and the foothills of the Sierra Nevada Mountains. The region consists of rolling topography with gentle slopes and oak woodlands scattered throughout.

Pleasant Grove and Curry creeks are the major drainage channels that drain the area from east to west. The oak tree groves and the riparian vegetation along the creeks create a strong visual contrast to the surrounding grasslands especially during the summer and fall when the tan color of the dry grasses dominates the landscape. Vernal pools are found throughout the region and provide additional visual interest through floral color displays in spring and early summer that contrast with the surrounding grasslands (Roseville 2003a).

PROJECT SITE AND VICINITY

The proposed project would be situated within a 40-acre property located on Phillip Road immediately north of the newly constructed PGWWTP. The 40-acre REP property is owned by the City of Roseville and is actually comprised of three parcels that the applicant would consolidate prior to building the project (Roseville 2003a). The REP property is generally level and at about the same elevation as the surrounding parcels. The power plant and electrical switchyard would occupy about nine acres of this property. The REP site is currently undeveloped, open grassland that was most recently used as a construction laydown area for the PGWWTP. The project site is surrounded by agricultural uses on the north, east, and west, and by the PGWWTP on the south. The Pleasant Grove Creek riparian corridor to the north runs within about 800 feet of the REP site.

There are three rural residences located very near the REP site: a residence with a large, commercial dog kennel located about 700 feet to the northwest; a second residence located about 900 feet directly to the north; and a third residence located north of Pleasant Grove Creek about 1500 feet to the northeast. The R.F. Fiddyment Ranch house is located about 2500 feet southeast of the REP site. As discussed in the **Cultural Resources** section of the FSA, the City of Roseville determined that Fiddyment Ranch meets eligibility criteria for the California Register of Historic Resources and National Register of Historic Places. The closest existing residential area to the project site is the Del Webb Sun City Roseville retirement community, which is located about 1.25 miles east of the site. South of Sun City on Fiddyment Road near the corner of Pleasant Grove Boulevard is the Sutter Retirement Community, which is a two-story apartment complex located about 1.5 miles southeast of the REP site. The WRSP envisions approximately 8400 new residential units in the areas west, south, east, and northeast of the proposed REP site. The closest of these planned residential areas is located about 1000 feet west of the REP site. Tentative Subdivision Maps for the first phase of residential development in West Roseville (representing over 2100 housing units) have been filed with the City of Roseville. The maps cover the areas east of the REP and PGWWTP and west of Fiddyment Road and south of Blue Oaks Boulevard (extension). The closest of these housing units are located approximately 2100 feet east of the REP site. Housing construction is anticipated to begin in early 2005.

The major roadway in the area from which views of the project would be possible is Fiddyment Road to the east. As reported in AFC Table 8.12-3, Fiddyment Road has an existing average daily traffic (ADT) volume of about 8,766 vehicles, north of Pleasant Grove Boulevard. The project site is visible from Phillip Road, which passes

immediately by the site. The current ADT on Phillip Road is 45 vehicles per day west of the REP site, and 157 vehicles per day west of Fiddyment Road.

VIEWING AREAS AND KEY OBSERVATION POINTS

Visual Resources Figure 1 (all of the visual resources figures are presented at the end of this analysis) depicts the areas from which the project would be visible (project viewshed). **Visual Resources Figure 2** shows the location and view direction of the KOPs selected to represent two sensitive viewing areas that would be most affected by the proposed project. This figure also shows the location and view direction of the local character photographs presented in **Visual Resources Figure 3**. The KOPs are:

- KOP 1 – Northwest corner of the REP property
- KOP 2 – Fiddyment Road south of Del Webb Boulevard

KOP 1 – Northwest Corner of the REP Property

KOP 1 is located at the northwest corner of the 40-acre REP property and is situated about 1125 feet northwest of the center of the REP site. This viewpoint was selected to approximate the existing view of the REP site of two rural residences located northwest and north of the site. **Visual Resources Figure 4A** shows the current view of the proposed power plant site looking southeast from KOP 1. The rural residence with the commercial dog kennel, which is situated about 315 feet southwest of KOP 1, is located approximately 1125 feet northwest of the center of the power plant site. (The exhaust stacks are located along the north-south centerline of the REP site within the northern half of the site.) This house faces west toward Phillip Road and looks out toward the rolling grasslands to the west and the Coast Range (visible on clear days) in the distant background. A row of tall, mature trees lines the rear of this house so views of the project site from this house are substantially screened and not unobstructed as **Visual Resources Figure 4A** suggests. A second residence is located about 1250 feet north of the power plant site center. This house faces south and there are no intervening trees or other landscape features so the occupants have an unobstructed view of the REP site, similar to what is shown in **Visual Resources Figure 4A** except that KOP 1 is located slightly closer (approximately 125 feet) to the site center than this residence. This house is accessed via a driveway along the northern boundary of the 40-acre REP property so the site is also visible as the residents drive to and from their house.

There is a third residence located about 1875 feet northeast of the center of the power plant site. This house is located north of Pleasant Grove Creek so the large oak trees along Pleasant Grove Creek block the view of the REP site. If any portion of the project is visible from this residence it would likely only be the tops of the stacks and the visible water vapor plumes that would emanate from the cooling tower and the two exhaust stacks. The driveway to this house runs north from Phillip Road, east of the REP site, so the residents see the REP site as they drive to and from their house. The R.F. Fiddyment Ranch is located about 2500 feet southeast of the site. The site is likely not visible from the main house as the property is surrounded by large trees and a large barn is located west of the house. Again, if any portion of the project is visible from the main house of Fiddyment Ranch it would likely only be the tops of the stacks and the plumes.

The most prominent features in the existing landscape visible from KOP 1 and looking toward the REP site are the open, undeveloped grassland of the city-owned parcels, several fruitless mulberry trees in the middle of the project site, several mobile homes (unoccupied), and construction office trailers, temporary structures and debris associated with the construction of the PGWWTP. Several of the PGWWTP buildings are visible in the background. Although not shown in **Visual Resources Figure 4A**, trees along Pleasant Grove Creek are also visible from the KOP 1 area.

The open grasslands, although not particularly unique, are an aesthetically pleasing landscape feature in the view toward the REP site, providing seasonally contrasting colors to the riparian vegetation located to the east along Pleasant Grove Creek. However, the REP site has been degraded by the PGWWTP construction activities and the rural view from KOP 1 has already been somewhat compromised by the industrial buildings at the PGWWTP. For these reasons, the present view towards the power plant site from KOP 1 is considered to be of moderately low visual quality. While there are no unique visual elements or features in the view, residents tend to have a high level of concern regarding views in proximity to their homes. The residents represented by KOP 1 would likely value the existing, primarily rural view and would perceive additional industrial development as adversely affecting the quality of their view. Although view concern is high, because the present visual quality is moderately low, and only one residence would have an unobstructed foreground view of the project, overall visual sensitivity at KOP 1 is considered moderate.

KOP 2 – Fiddyment Road South of Del Webb Boulevard

KOP 2 is located on Fiddyment Road about 1100 feet south of its intersection with Del Webb Boulevard and about 1.6 miles southeast of the REP site. **Visual Resources Figure 5A** shows the current view from this viewpoint looking to the northwest towards the PGWWTP and the REP site. This KOP was chosen to represent the view of travelers along Fiddyment Road, as well as residents in the Del Webb Sun City Roseville retirement community, which borders Fiddyment Road to the east.

Sun City consists of single-family dwellings interspersed with open riparian corridors and other open spaces, a large golf course, and a community center. The community is separated from Fiddyment Road by a large concrete wall, and very few if any of the residences within the community are oriented such that their residents would have a view towards the project site. The Sun City community is relatively new, and was constructed with attractive landscaping along its arteries and open spaces, including along the east side of Fiddyment Road, resulting in a generally pleasing, suburban character. Further south of KOP 2 and south of Sun City is a large two-story retirement apartment complex. Residents of a few of the apartments in this complex have a view towards the project site, about 2 miles away to the northwest, but most of the apartments have no views towards the project site. As the landscaping trees planted along the east side of Fiddyment Road mature, they should provide even greater screening of views toward the project site from residences located east of the road.

Travelers along Fiddyment Road and the few nearby residents with views towards the project site now see large fields, which dominate the foreground and middleground of the view from KOP 2, with lines of trees and the structures of the PGWWTP in the

distant background. A power line along the west side of Fiddyment Road is also visible from the area of KOP 2. Considering all the aspects that contribute to the quality of a given view, staff determined that the views toward the project site from the area of KOP 2 are of moderately low to moderate quality. Although the open grasslands and the lines of trees in the background are aesthetically pleasing, the scenic value of the view towards the project site from KOP 2 is about average when compared to the scenic value of similar views from roads in the project vicinity, as well as compared to similar settings in any area of mixed rural and suburban lands.

While residents generally tend to have a high level of concern regarding views in proximity to their homes, with the concrete walls and landscaping lining Fiddyment Road to the east, staff found little to no evidence that residences in the area of KOP 2 regularly enjoyed views towards the project site from their houses or their yards. Sun City residents do have a brief view toward the site as they exit the development at Del Webb Boulevard. Commuters in suburban areas have a lower expectation or concern for views along their commute route than residents would have for views from the windows of their homes or from their yards.

Approximately 4400 motorists per day have some view of the project site as they travel northbound on Fiddyment Road between Baseline Road and Phillip Road. Groves of oak trees block views of the project site for travelers further north on Fiddyment Road. From KOP 2, the most visible portion of the REP would be the 120-foot tall exhaust stacks, which would be located about 1.8 miles to the northeast at an approximately 45 degree angle to the centerline of the roadway. Staff considers the area within 45 degrees of the centerline of the direction of travel to be within drivers' primary cone of vision. South of KOP 1, at the three-way stop-controlled intersection of Fiddyment Road and Pleasant Grove Boulevard, the REP stacks would be visible at a less peripheral angle to roadway, but at about 2.1 miles, they would be located further away. The closest unobstructed northbound view of the project from Fiddyment Road would occur near its intersection with Phillip Road, where the exhaust stacks would be about 1.5 miles away, but well outside a driver's normal cone of vision. The moderate number of motorists, their high rate of speed, the over 1.5-mile distance to the project, and the nearly peripheral angle of view from the roadway all contribute to an overall moderately low degree of exposure for motorists on Fiddyment Road.

Because the present visual quality is moderately low to moderate, few if any residences have views in the direction of the site, and travelers' exposure to the project site is moderately low, the overall visual sensitivity at KOP 2 is considered moderately low.

IMPACTS

The following discussion of project impacts is organized around the four questions in the Environmental Checklist (Appendix G of the CEQA Guidelines).

SCENIC VISTAS

The first checklist question is: Would the project have a substantial adverse effect on a scenic vista? Staff did not identify any scenic vistas within the project viewshed, nor are

any identified in the City of Roseville General Plan. Thus, the project would have no impact under this criterion.

SCENIC RESOURCES

The second checklist question asks: Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor? Existing vegetation at the REP site consists of grass and several fruitless mulberry trees in the center of the site. According to the AFC, the trees are remnants of the landscaping for a rural residence that once occupied the site. These landscape features are not considered unique or exceptionally scenic. The site does not contain rock outcroppings or historic buildings that could be damaged by the proposed project, nor is project within view of a State Scenic Highway. The REP would not block views of any identified or observed important view areas as seen by viewers in the areas of KOPs 1 or 2. Therefore, the project would have no impact under this criterion.

VISUAL CHARACTER OR QUALITY

The third CEQA checklist question is: Would the project substantially degrade the existing visual character or quality of the site and its surroundings? The project aspects that were evaluated under this criterion include project construction, the power plant structures, the various pipelines, and visible water vapor plumes.

Project Construction

Construction of the proposed power plant and associated facilities would cause temporary visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. The areas to the southwest and east of the REP site would be used during construction for storage of equipment and materials and for parking by construction workers. Construction of the project is expected to last for 18 to 20 months.

The visual impacts of constructing the power plant and pipelines (gas, recycled water, sanitary sewer, and outfall) as viewed from KOP 1 area would not be significant because the visual disturbances would be temporary and would only be highly visible to one residence with an unobstructed view of the REP site and construction areas, and because the present visual quality of the view from this residence is moderately low. These activities would also be visible to the low number of travelers on Phillip Road, but because this road doesn't have any scenic designation, and the visual disturbances are temporary, the impacts on these viewers would also not be significant. Visual impacts of power plant construction would not be significant as seen from the area of KOP 2 due to the temporary nature of these activities, the very low number of residences with unobstructed views of the REP site and laydown area, the approximately 1.4 mile distance to the nearest of these residences, and the moderate overall visual quality of the viewshed.

Alternative A gas pipeline construction activities may be visible to some residents of Sun City and would be visible to motorists driving along the roads the pipeline would follow: Country Club Drive, Baseline Road, and Fiddyment Road. Alternative D

construction activities would occur within currently undeveloped grassland areas. Construction of this pipeline alternative would be visible to motorists on Phillip Road, which is located approximately 2000 feet to the east of the Route D. A typical pipeline construction team would require a bulldozer, backhoe, boom trucks, excavation diggers, material delivery trucks, welding trucks and inspection vehicles. Typically, pipeline construction activities (from site preparation to restoration) could potentially be viewed from any one residence for up to two weeks, with decreasing levels of visual clarity as the distance to construction activities increases. Because of the very temporary nature of these activities, gas pipeline construction would not cause significant visual impacts.

The AFC (page 8.7-17) states that typical construction hours would be between 7 a.m. and 7 p.m. on weekdays and 8 a.m. and 8 p.m. on weekends, and that additional hours may be necessary to complete critical construction activities. Some activities, such as horizontal directional drilling to avoid sensitive habitat areas, would continue 24 hours per day, seven days per week. In the event that construction occurs at night, staff believes that the applicant should take measures to minimize the offsite visibility of any construction lighting. Thus, staff proposes Condition of Certification **VIS-1** which requires light fixtures to be hooded, shielded and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and light trespass (direct light extending outside the boundaries of the power plant site or construction area). The condition also requires lighting to be only as bright as is necessary for security and a safe working environment, and to be kept off when not in use, wherever this is feasible and safe and not otherwise needed for security. These mitigation measures would ensure that lighting impacts associated with construction are kept to less than significant levels.

Operation Impacts of the Power Plant Structures

The power plant structures would include two 120-foot tall heat recovery steam generator (HRSG) exhaust stacks, two 53-foot tall HRSG units, two 35-foot tall gas combustion turbine generators (including the inlet air filters), a 45-foot tall steam turbine generator (including pedestal), and a 44-foot tall four-cell cooling tower. The project would include an on-site zero liquid discharge (ZLD) system to process industrial wastewater. The most prominent features of the ZLD system are the two 80-foot tall brine concentrator stacks and the two 70-foot tall crystallizer stacks. A detailed analysis of the visual impacts of the power plant structures was conducted for each KOP and is presented below.

KOP 1 – Northwest Corner of the REP Property

KOP 1 is located at the northwest corner of the 40-acre REP property and was chosen to represent the view of two rural residences located north and northwest of the REP site. As explained earlier, it is only the residence located about 1,250 feet due north of the center of the REP site that would have an unobstructed view of the power plant. Open undeveloped grasslands are the predominant landscape feature occupying the current view from KOP 1. Industrial buildings at the PGWWTP are visible in the background of the view but do not dominate the view from KOP 1. The existing view is considered to be of moderately low visual quality. **Visual Resources Figure 4B** presents a visual simulation of the proposed project as it would be seen from KOP 1.

As seen from KOP 1, the REP would introduce prominent geometric forms with industrial character into a setting without similar features. The PGWWTP buildings are visible in the background but they are fairly low on the horizon and are not prominent in the view from KOP 1. The structural characteristics of the project, including the prominent vertical elements of the two turbine/HRSG exhausts, would contrast highly with the flat, horizontal form of the existing landforms. The predominantly neutral gray colors of the project depicted in the visual simulation would contrast moderately with the blue, sky backdrop and the seasonally changing colors (green to tan and brown) of the surrounding grasslands. Overall, the REP would cause a high degree of visual contrast with the existing setting visible from KOP 1.

The power plant structures would dominate the existing structures at the PGWWTP and would occupy a large portion of the landscape visible from KOP 1. The project structures would be seen against the sky, thereby increasing the conspicuousness of the proposed REP. Overall, the REP is considered to have moderately high dominance.

Other than the sky, the project would not block any features with visual quality higher than that of the power plant itself. The severity of the view blockage caused by the project would be moderately low at KOP 1.

Visual Impact Significance

The project would cause a moderately high degree of overall visual change (as a result of its contrast, dominance, and view blockage) to the existing setting as seen from KOP 1. Taking into account that the present view is of moderately low visual quality and the moderately high degree of visual change caused by the proposed project would be experienced by the one residential viewer that would have an unobstructed extended view of the project, the visual impact of the REP structures is considered adverse but not significant.

KOP 2 – Fiddyment Road South of Del Webb Boulevard

The only dominant existing structure in the view is the power line adjacent to west side of Fiddyment Road. The foreground and middleground of the view is dominated by open grasslands. In the background are lines of trees near the horizon, and the PGWWTP structures. Very few other structures are visible in the background of the views from KOP 2. The present view from KOP 2 toward the REP site is of moderately low to moderate visual quality. **Visual Resources Figure 5B** presents a visual simulation of the proposed project as viewed from KOP 2.

As seen from KOP 2, the simple geometric forms and straight lines of the project structures would be similar to the forms and lines of the PGWWTP to the south of the REP site. The HRSG exhaust, brine concentrator, and crystallizer stacks would be similar to other vertical elements in the view from KOP 2. The medium-gray color depicted on the majority of the structures would blend with the sky and contrast moderately with the seasonally changing colors of the field (green to tan and brown) and the seasonally green trees in the foreground. Overall, visual contrast with the existing setting would be moderately low.

The power plant structures would appear comparable in size to the structures of the PGWWTP. The project would occupy a very small portion of the landscape visible from KOP 2. Although the HRSG units and the stacks would be seen against the sky, increasing the visibility of the proposed project somewhat, overall the REP would be a subordinate feature in the view from KOP.

The project structures would block from view a very small portion of the sky. The project would also block from view some trees in the background, but these trees are a relatively small feature in the view from KOP 2. The severity of the view blockage is considered low.

Visual Impact Significance

The project would cause a low degree of overall visual change to the existing setting as seen from the area of KOP 2. When considered within the context of the moderately low visual sensitivity of the existing landscape, the low degree of visual change that would be perceived from KOP 2 would not substantially degrade the existing visual quality of the area, and therefore would result in an adverse but less than significant impact.

Operations Impacts of Linear Facilities

After the various REP pipelines are buried, RE would return the areas disturbed by construction activities to their pre-construction condition, thereby minimizing the impact on the landscape. Warning signs would mark the location of the underground natural gas supply pipeline but would likely go unnoticed by passersby. The open ditch portion of the outfall would be below grade so it would not be highly visible. Considering all of these factors, operation of the pipelines would not result in significant visual impacts.

Impacts of Cooling Tower and Combustion Exhaust Plumes

The proposed REP is a combined-cycle power plant that would include a four-cell, 44-foot-tall cooling tower and two 120-foot tall turbine/HRSG exhaust stacks. Under certain weather conditions, visible water-vapor (steam) plumes would emanate from both the cooling towers and exhaust stacks. REP has not proposed any methods to abate or prevent the formation of the visible plumes. Because water vapor plumes are generally associated with heavy industrial land uses, they tend to be regarded negatively by visually sensitive observers and as such could have an adverse effect on visual resources in the vicinity of the project. The severity of the impacts created by the project's visible plumes depends on several factors, including the frequency and physical size of the plumes, the sensitivity of the viewers who will see the plumes, the distance between the plumes and the viewers, the visual quality of the existing viewshed, and whether any scenic landscape features would be blocked by the plumes.

The first step in staff's visible plume impact analysis is to determine through computer modeling the expected frequency of the plumes. Staff focuses its 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 (October through March for this case) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. If the modeling predicts seasonal daylight clear plume frequencies greater than 20 percent, the second step in staff's analysis is to calculate 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. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change caused by the plumes may result in significant visual impacts.

Staff used the Combustion Stack Visible Plume (CSVP) model and a four-year (1990-1993) meteorological data set, obtained from the National Climatic Data Center, from Sacramento International Airport to calculate the frequencies and sizes of the REP cooling tower and HRSG plumes. Because RE has not finalized which turbine they will be using for the REP, staff has modeled two potential turbine configurations (the Alstom GTX100 and General Electric LM6000 PC Sprint turbines). For each turbine configuration, plume frequencies and sizes are presented for two anticipated operating schedules. Staff's complete plume modeling report (Walters and Blewitt, 2004) can be found in **Appendix VR-2** at the end of the Visual Resources section of the FSA.

In order to determine potential plume frequencies and sizes for this project, two anticipated operating schedules were used to determine how many hours of peaking (duct firing) would occur. Peaking operations, based on the original project operating schedule provided in Table 8.1-10 of the AFC, would be anticipated to occur frequently, over 46 percent of the year and almost one-half of the time the plant is in operation. For this original operating scenario, using the amount of duct firing forecast for the 1st quarter (January through March) and 4th quarter (October through December) and actual City of Roseville power demand curve data, the peaking hours were adjusted from that used to provide the modeling results presented in the PSA, to assume that peaking operations occur over 10 hours per day starting at 11 am daily during the 1st quarter and over 13 hours per day and during all daylight hours during the 4th quarter. This amounts to a reduction in the daytime duct firing hours assumption that was presented in the PSA, which assumed duct firing occurred during all daylight hours for both quarters.

The applicant is currently constrained due to air permit restrictions, so a second operating profile has also been evaluated. For the second reduced operating schedule it is assumed that there is on average 6 hours per day of duct firing running, and based on Roseville power demand data, the duct firing would occur from 1 pm through 7 pm daily. However, staff believes that it is the intent of the applicant to be able to operate the schedule presented in the AFC, whether through obtaining additional offsets in the future or due to the fact that the actual emissions will be lower than the estimated emissions used to determine offset requirements giving the applicant the ability to operate more than their current estimate of constraint.

Visual Resources Table 1 presents the REP cooling tower plume frequency and size results during seasonal daylight clear hours, for both turbine configurations and the two

noted operating schedules. For both turbine configurations and operating schedules, the REP cooling tower plume frequencies would exceed staff's frequency threshold of 20 percent of seasonal daylight clear hours. As reported in **Table 1**, the one percentile cooling tower plumes are predicted to range in size (depending on operating schedule) from 1724 feet long and 2000 feet tall to 1961 feet long and 2560 feet tall if the LM6000 turbines are used, or from 1774 feet long and 2218 feet tall to 2673 feet long and 2951 feet tall if the Alstom GTX100 turbines are used. Although the one percentile clear hour plumes would be extremely large and very noticeable to a wide area, they would occur very infrequently – only about nine hours per year on average. For this case, staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. As can be seen in **Table 1**, the 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20 percent of the time, and it is the largest of the plumes that are predicted to occur greater than 20 percent of the time. In other words, 80 percent of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. Cooling tower plumes as large as or larger than the 20th percentile clear hour plume are predicted to occur approximately 174 hours per year on average. The 20th percentile cooling tower plumes are predicted to range in size (depending on operating schedule) from 108 feet long and 145 feet tall to 184 feet long and 221 feet tall for the LM6000 turbines, or from 144 feet long and 175 feet tall to 253 feet long and 283 feet tall for the Alstom GTX100 turbines.

Visual Resources Table 1
Staff Predicted "Clear" Hours Cooling Tower
Plume Frequencies and Dimensions

Turbine	**Cooling Tower "Clear" Hours Plume Dimensions**		
Alstom GTX100 – Original Operating Schedule (58.4% frequency)			
Percentile	Length	Height	Width
1%	2,673	2,951	498
5%	794	998	212
10%	374	530	144
15%	295	370	129
20%	**253**	**283**	**122**
25%	210	224	118
30%	157	183	110
35%	118	152	104
40%	95	127	97
45%	59	102	86
50%	39	81	76
55%	20	65	62
LM6000 PC Sprint – Original Operating Schedule (49.4% frequency)			
Percentile	Length	Height	Width
1%	1,961	2,560	402
5%	689	851	191
10%	328	430	133
15%	272	296	123
20%	**184**	**221**	**112**
25%	144	175	105
30%	108	142	98
35%	79	114	90
40%	46	92	79
45%	20	68	64
Alstom GTX100 – Reduced Operating Schedule (40.6% frequency)			
Percentile	Length	Height	Width
1%	1,774	2,218	367

5%	558	642	161
10%	282	351	123
15%	207	237	111
20%	**144**	**175**	**104**
25%	98	137	96
30%	62	105	85
35%	33	79	71
40%	8	55	49
LM6000 PC Sprint – Reduced Operating Schedule (36.1% frequency)			
Percentile	Length	Height	Width
1%	1,724	2,000	354
5%	512	590	148
10%	239	294	115
15%	151	190	102
20%	**108**	**145**	**95**
25%	79	109	88
30%	33	82	70
35%	7	56	49

Data provided in feet and height includes the 44 foot cooling tower cell height.

Staff also modeled the HRSG plumes using the CSVP model with the same four-year meteorological data set from Sacramento International Airport. **Visual Resources Table 2** presents the HRSG plume frequency and size results during seasonal daylight clear hours, for both turbine configurations and the two previously noted operating schedules. With the LM6000 turbines and under both operating schedules, the HRSG plume frequencies exceed staff's threshold of 20 percent of seasonal daylight clear hours. With the Alstom GTX100 turbines, the threshold is only exceeded under the original AFC operating schedule. With the LM6000 turbines, the 20th percentile clear hour HRSG plumes are predicted to range in size (depending on operating schedule) from 128 feet long and 165 feet tall to 220 feet long and 229 feet tall. Under the reduced operating schedule with the Alstom turbines, the HRSG plumes only occur 8.8 percent of the seasonal daylight clear hours so there is no 20th percentile plume size to report. If the REP were operated as originally anticipated in the AFC, the 20th percentile clear hour HRSG plumes with the Alstom GTX100 turbines are predicted to be 121 feet long and 156 feet tall.

Visual Resources Table 2
Staff Predicted "Clear" Hours Turbine/HRSG
Plume Frequencies and Dimensions

Turbine	**Turbine/HRSG "Clear" Hours Plume Dimensions**		
Alstom GTX100 – Original Operating Schedule (22.5% frequency)			
Percentile	Length	Height	Width
1%	1,228	1,061	233
5%	328	389	79
10%	213	232	55
15%	174	187	47
20%	**121**	**156**	**39**
LM6000 PC Sprint – Original Operating Schedule (49.7% frequency)			
Percentile	Length	Height	Width
1%	1,419	1,376	265
5%	469	548	110
10%	239	351	69
15%	249	267	62
20%	**220**	**229**	**56**
25%	177	206	51
30%	157	187	47
35%	131	173	44

40%	125	160	40
45%	98	147	35
Alstom GTX100 – Reduced Operating Schedule (8.8% frequency)			
Percentile	Length	Height	Width
1%	761	841	149
5%	207	208	50
LM6000 PC Sprint – Reduced Operating Schedule (26.1% frequency)			
Percentile	Length	Height	Width
1%	1,146	1,227	219
5%	358	383	77
10%	223	240	55
15%	177	195	47
20%	**128**	**165**	**40**
25%	85	140	33

Data provided in feet and height includes the 120 foot stack height.

For each KOP, staff conducted a visual impact analysis of the reasonable worst case REP cooling tower and HRSG plumes, which is presented below.

KOP 1 – Northwest Corner of the REP Property

Staff did not identify any other existing sources of industrial plumes in the project viewshed. There could be the potential for fog forming above the waste water ponds at the PGWWTP as cold, dry air moves across the warmer water. This phenomenon would appear more like fog than the distinct plumes that would be created by the REP cooling tower and HRSG exhausts, so the project's plumes would be a unique and new feature in the project area. In addition, the fog forming above the PGWWTP waste water ponds likely would not rise very high above the water.

Due to the openness of the project site and surrounding area, the high frequency and large sizes of the REP water vapor plumes during peaking operations would cause a noticeable but intermittent change in the landscape character when viewed from nearby vantage points. The plumes would be most prominent as viewed from within the foreground distance zone (up to one-half mile). The area within approximately one-half mile of the site is sparsely populated. The only existing residences within this area are the three rural residences located north of the REP site, whose view is represented by KOP 1, and the R.F. Fiddyment Ranch, which is located about 2500 feet southeast of the site.

The plumes would appear as prominent, billowing linear-to-irregular forms with irregular and changing outlines. The plumes would rise vertically on calm days, and diagonally across the sky when the wind is blowing. The movement of the plumes would be noticeable from foreground viewing locations, and less noticeable from middleground to background viewing locations.

Under clear sky viewing conditions, the white cooling tower plumes would contrast highly with the blue sky background. The vertical and diagonal, irregular and changing form of the plume would distinguish the plume from the broad, horizontal, natural landforms and the generally uniform appearance of sky. As seen from KOP 1, the plumes would cause a high degree of visual contrast with the existing setting.

Intermittently, the cooling tower and HRSG plumes would become the major feature in the immediate project area. Staff's modeling predicts larger cooling tower plumes with

the Alstom GTX100 turbines than with the LM6000 turbines. Depending on operating schedule, the 20th percentile cooling tower plumes with the Alstom GTX100 turbines could range in size from 144 feet long and 175 feet tall (including the 44-foot tall cooling tower) to 253 feet long and 283 feet tall. Plumes of these heights would be about as tall as a 13- to 22-story office building. For the HRSGs, staff's modeling predicts larger plumes with the LM6000 turbines than with the Alstom GTX100 turbines. In addition, the model predicts a seasonal daylight clear plume frequency of only about nine percent with the Alstom turbines under the reduced operating schedule. Depending on operating schedule, the 20th percentile HRSG plumes with the LM6000 turbines could range in size from 128 feet long and 165 feet tall (including the 120-foot tall exhaust stack) to 220 feet long and 229 feet tall. The movement of the plumes, their elevated position above the viewers in the area of KOP 1, and their backdrop against the sky would all contribute to the prominence of the plumes. The REP plumes would appear dominant to the viewers represented by KOP 1.

When the plumes are present, they would block portions of the sky. No other unique or notable scenic features would be blocked by the plumes. The severity of the view blockage caused by the plumes is considered moderately low at KOP 1.

Visual Impact Significance

The REP plumes would cause a moderately high degree of overall visual change (as a result of their contrast, dominance, and view blockage) to the existing setting as seen from KOP 1. Taking into account that the present view is of moderately low visual quality and the moderately high degree of visual change caused by the reasonable worst case plumes would be experienced by very few residential viewers (the three residences immediately north of the site and the R.F. Fiddyment Ranch to the southeast), the visual impact of the visible plumes is considered adverse but not significant.

KOP 2 – Fiddyment Road South of Del Webb Boulevard

For any resident or traveler in the area of KOP 2, the reasonable worst case plumes would be a relatively small feature in the broad, panoramic landscape off to the northwest about 1.5 miles away. From this viewpoint, the plumes would not block any view of important visual resources in the area. The plumes would not greatly contrast with the surroundings because of their relatively small size compared to other distinct landscape features and to the broad landscape, and their white color would blend somewhat with the haze close to the horizon.

Visual Impact Significance

The overall visual change to the viewshed caused by REP cooling tower and exhaust stack plumes would be moderately low because of the plumes' moderately low degree of contrast and dominance and low degree of view blockage. When considered within the context of the moderate overall sensitivity at KOP 2, the moderately low degree of visual change caused by the plumes would not substantially degrade the existing visual quality of the view, and therefore would result in an adverse but less than significant visual impact.

Future Viewers in the West Roseville Area

To assess the impacts of the vapor plumes on future viewers in the West Roseville Area, staff prepared visual simulations of the REP's expected plumes as they would appear from a viewpoint (KOP 3) along Phillip Road, approximately 2100 feet southeast of the REP cooling tower. **Visual Resources Figures 6A through 6C** show the current view and simulations of the 20th percentile plumes for both turbine configurations and operating schedules from this viewpoint. KOP 3 was selected to approximate the view that would be available to viewers as they drive north on Phillip Road to enter the future Regional Sports Park, a 75-acre city-wide park to be built east and southeast of the REP site, in the areas immediately east of Phillip Road. (A conceptual plan of the Regional Sports Park in the West Roseville Specific Plan shows several access points into the park from Phillip Road. KOP 3 is located on Phillip Road at about the midpoint of the regional park, just south of one of these entry points). The Regional Sports Park and adjacent high school site will include various joint-use recreational facilities such as soccer fields, baseball fields, a soccer/football stadium, tennis courts, softball fields, and outdoor swimming pool, basketball courts, and a 400 meter track.

From KOP 3 and from vantage points further south along Phillip Road, the 20th percentile plumes would be noticeable to viewers as they drive north to access the sports park. Further north, the road dips down and the berm built along the east side of the PGWWTP would obscure views of the plumes. Views of the plumes would be further blocked as the trees planted along the east boundary of the PGWWTP continue to grow. The conceptual plan for the Regional Sports Park shows trees along the west boundary of the park (east side of Phillip Road) and scattered throughout the park grounds. These trees would also block sightlines toward the plumes. In addition, once inside the park, viewers would be more focused on sports activities and less attentive to the 20th percentile plumes.

Although the plumes would be prominent, they would not dominate the wide, panoramic view available from the viewpoint depicted in the figures. Other than the sky, the plumes would not block observed or documented important views or landscape features. The water vapor plumes would not substantially degrade views from the Regional Sports Park because of their varying visibility from the area and because they would not dominate the setting or block important visual features other than the sky when present. From residences in the areas to the east and southeast of the REP site, some of which are expected to be built prior to operation of the REP, the plumes would appear smaller than those depicted in the simulations because the residential areas are located farther away from the cooling tower (approximately 2500 and 3900 feet, respectively) than KOP 3. Furthermore, as shown on Tentative Subdivision Maps that have been filed for the first phase of development (representing approximately 2100 housing units), residences are oriented such that most views in the direction of the REP site likely would be blocked by neighboring houses or the masonry walls to be built behind residences that would border on major collector roads (such as the future Hayden Parkway east of the REP). In addition, as shown in the West Roseville Specific Plan, trees would be planted along both sides of the collector roadways, and in the case of Hayden Parkway, also within the median. This landscaping as it grows would also screen views from the residential areas toward the REP site. As an illustration of similar screening, see **Visual Resources Figure 3**, VC#5, which shows the landscaping along Fiddyment Road

where it borders Sun City. Because of the limited visibility from the houses and the approximately 0.5 mile distance, and because the 20th percentile plumes would not be dominant or block important visual resources, the REP water vapor plumes would not substantially degrade views of the residences to be built to the east and southeast of the REP site. To ensure that plumes do not cause significant visual impacts, staff proposes **VIS-2** to ensure that the cooling tower is designed and operated as was modeled in the FSA. This condition addresses the design of the "wet" section of the cooling tower and therefore does not conflict with staff's proposed **TRANS-7**, which deals with the design of a "dry" section of the cooling tower to limit the formation of "ground hugging" plumes that could cause a traffic safety problem on nearby roadways in West Roseville (please refer to the **Traffic and Transportation** section of the FSA). Because the modeling assumptions for temperature and moisture content of the HRSG exhausts are conservative, a comparable "design" condition for the HRSGs is not necessary.

LIGHT OR GLARE

The fourth CEQA checklist question asks: Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area? Currently there are no sources of nighttime lighting at the REP site. There are sources of nighttime lighting in the vicinity of the site that are visible from KOPs 1 and 2, including streetlights along Fiddyment Road and security and operations lighting at the PGWWTP. The REP project would require nighttime lighting for operational safety and security. If project lighting were uncontrolled, the resultant direct light trespass and uplighting to the nighttime sky could cause significant adverse visual impacts on nearby sensitive visual receptors, such as the residences in the KOP 1 area, and in the case of uplighting, adverse impacts on more distant visual receptors too, such as those near KOP 2.

RE has committed to minimizing offsite lighting impacts (Roseville 2003a; pages 8.13-11, 8.13-13, and 8.13-16). Specifically, exterior lights would be hooded to prevent direct illumination of the night sky. In addition, lights would be directed downward and situated and designed (shielded) to prevent dispersal of direct light onto adjacent properties. High illumination areas not occupied on a regular basis and not required to be lit for security would have switches or motion detectors to light these areas only when occupied. Illumination levels would be limited to that required for worker safety and security. Because of RE's commitment to minimize offsite light impacts, the REP project would not create a substantial new source of light or glare that could adversely affect nighttime views. Staff proposes Condition of Certification **VIS-3**, which would require Energy Commission staff's review and approval of the project's lighting plan to ensure that the measures proposed by RE are properly implemented.

The applicant proposes to paint all major project structures in neutral colors to blend with each other and the surrounding environment. The predominately gray project colors would blend well with the sky, helping the plant fade into the background when seen from a distance. Alternatively, staff would suggest a color scheme similar to that used at the PGWWTP, which has buildings painted/treated in a mix of gray and tan colors. The AFC specified that the various project buildings would have "off white" colored walls. In Data Request #65, staff expressed concern that the off-white color of

these buildings could cause offsite glare impacts. RE responded that a less contrasting color (such as a medium gray color like that proposed for the bulk of the power plant structures) could be selected during compliance from the manufacturer's standard colors (CH2MHill 2004a). Additionally, staff requested that the applicant consider incorporating measures that could minimize the amount of sunlight that could potentially be reflected off of the aluminum lagging that typically covers brine concentrator and crystallizer stacks, HRSG piping and drums, and in some cases HRSG stacks. To address this potential daytime glare issue, RE proposes to use the corrugated or embossed-type aluminum lagging where it would be visible offsite. Furthermore, where feasible, the applicant would treat structures visible offsite with non-reflective paints and use embossed or corrugated surfaces (CH2MHill 2004a, Data Response #66). Staff proposes Condition of Certification **VIS-4**, which would require Energy Commission staff's review and approval of a structural surface treatment plan to ensure that the measures proposed by RE are properly implemented. With the mitigation measures proposed by RE and staff, the REP would not be a source of substantial glare that could adversely affect daytime views in the project area.

CUMULATIVE IMPACTS

As defined in Section 15355 of the CEQA Guidelines (Cal. Code Regs., tit. 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, though any one project in a given area may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in the area may create significant impacts. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; or (3) visual quality is diminished.

The PGWWTP is the only existing project in the immediate vicinity of the REP site. The REP in combination with the PGWWTP would increase the industrial character of the primarily rural, agricultural area. Looking from KOP 1, the PGWWTP is not dominant in the view as the buildings have a low profile and are partially screened from view by the berm that was constructed along the northern boundary of the PGWWTP along Phillip Road. Landscaping has been planted around the PGWWTP which over time will reduce the visibility of the waste water treatment plant buildings. The REP would appear much more massive in the view from KOP 1 because it includes structures that are larger than the PGWWTP buildings and it would be located closer to this viewpoint. However, the cumulative visual impact of the REP and the PGWWTP is not considered significant from KOP 1 because the viewpoint represents so few sensitive viewers, the present visual quality is moderately low, and the REP would block much of the PGWWTP buildings from view but would not block any important scenic resources.

The existing view from KOP 2 is largely dominated by pasture land in the foreground and middleground of the view. The PGWWTP is located about 1.25 miles northwest of KOP 2 so it is not very noticeable from this viewpoint. The only dominant structure in the view is the electric distribution line that runs along the west side of Fiddyment Road.

Because few if any residences in the area are oriented such that they would have views of the REP project, because the REP site is currently open space with no dominant structures near it, and because the current view is of moderately low to moderate visual quality, the cumulative visual impact of the REP in combination with existing projects is not considered significant from KOP 2.

In February 2004 the City of Roseville approved the West Roseville Specific Plan. The WRSP envisions approximately 8,400 new residential units in the areas west, south, east, and northeast of the proposed REP site, as well as some general and light industrial development immediately west and south of the PGWWTP. The WRSP would substantially change the visual character of the area surrounding the REP site. As seen from KOP 1, the REP project would substantially contribute to this change in character due to its proximity to the viewpoint and large mass, but because the viewpoint represents so few existing sensitive viewers, the REP would not combine together with the WRSP to cause significant cumulative visual impacts. The development proposed in the WRSP would block views of the REP project from the KOP 2 area, so the REP would not combine together with the WRSP to cause significant cumulative impacts on existing viewers at this viewpoint.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LOCAL

The REP site is zoned Public/Quasi-Public. Power generation facilities are conditionally permitted uses in the Public/Quasi-Public zoning district. The City of Roseville has an established process for the review and approval of public projects that mirrors the Conditional Use Permit process for private development projects. The Roseville Community Development Department coordinates the review of city projects by all relevant city departments to develop a comprehensive list of conditions of approval. On August 18, 2004, Energy Commission staff received a document that contains a set of conditions that the City of Roseville believes are necessary to ensure that the project complies with applicable City LORS. **Visual Resources Table 3** provides a listing of the applicable visual resources-related LORS for the City of Roseville and presents staff's determination of the project's consistency with these LORS. The City's input has been incorporated into this analysis where appropriate.

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		Consistency Determination
Source	**Objective and Policy Descriptions**	
City of Roseville General Plan Land Use Element, Community Design Component,	Goal 1: "Achieve a consistent level of high quality aesthetic and functional design through the development of, and adherence to, superior design concepts and principles as defined in the Community-wide Design Guidelines."	**Yes, with Conditions VIS-3 through VIS-6 and LAND-1.** City of Roseville Condition of Approval 6 specifies that RE shall submit a landscape and architectural plan to the Planning Department to ensure that the project complies with standards for industrial development identified in the City's Community Development Guidelines. Staff's proposed conditions of certification **VIS-3**

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		Consistency Determination
Source	**Objective and Policy Descriptions**	
Chapter C. Goals and Policies	Policy 1: "Through the design review process, apply design standards that promote the use of high quality building materials, architectural and site designs, landscaping, signage, and amenities." Policy 3: "Encourage designs that strike a balance between the incorporation of aesthetic and development requirements, and the economic considerations associated with development." Policy 6: "Through the design review process, encourage site and building designs that are in scale and compatible with adjacent development with respect to height, bulk, form mass, and community character."	(Permanent Exterior Lighting), **VIS-4** (Painting/Treatment of Project Structures), **VIS-5** (Landscaping), and **VIS-6** (Fences, Signs, and Storage/Trash/Recycling Areas) require that RE submit project design plans to the Energy Commission CPM for review and approval and to the City for review and comment. See also **LAND-1** in the **Land Use** section of the FSA. The REP's consistency with specific design guidelines is discussed in detail below.
City of Roseville Zoning Ordinance, Chapter 19.16 – Civic and Resource Protection Zones, Section 19.16.030 – General Development Standards	A. General. "Permitted uses and structures shall comply with the City's adopted Design Guidelines, applicable Specific Plans, and any other applicable requirements in this Title."	**Yes, with Conditions VIS-3 through VIS-6.** The visual resources conditions of certification would ensure that the project is built in accordance with the City's adopted community-wide design guidelines.
City of Roseville Community Development Guidelines; Chapter 5, Design Guidelines for Industrial Districts	Industrial Design Goal: "It is the goal of the Design Guidelines for Industrial Projects to lead to developments which will maximize the efficiency and utility of the project, present an appealing appearance to public view, and minimize any adverse impacts to adjacent properties."	**Yes, with Conditions VIS-3 through VIS-6.** Although not likely to be considered to have an "appealing appearance" by most viewers, the power plant structures and buildings would be painted or treated to visually blend with the surrounding environment; structures would be repainted as needed to maintain a high-quality appearance for the life of the project; and structural surfaces would be treated so as not create substantial glare (**VIS-4**). Lighting would be controlled to minimize adverse visual impacts on adjacent properties (**VIS-3**). **VIS-5** would require installation of landscaping coinciding with the construction of the westward extension of Blue Oaks Boulevard and the rerouting of Phillip Road. The landscaping would improve the appearance of the project site and overtime would screen the project structures. Visible plumes from the project, particularly those emanating from the cooling towers may be perceived as unappealing, considering the high aesthetic standards of the WRSP. To ensure that the visual impacts of the REP visible plumes are less than significant, staff is proposing condition **VIS-2** to ensure that the cooling tower is built and operated as it was

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		
Source	**Objective and Policy Descriptions**	**Consistency Determination**
		modeled in the FSA.
	A. Site Design; 5.A.1. General Design Intent: "To promote designs that consider, and respond appropriately, to adjacent uses."	**Yes, with Conditions VIS-3 through VIS-6.** See Industrial Design Goal discussion above.
	A. Site Design 5.A.2 Site Planning and Building Siting; a. Site Coverage. Intent: "To ensure that industrial projects are designed to include a mix of building footprint, landscape/open space areas, and parking and circulation areas, in balanced proportions that create beneficial bulk, mass and scale relationships within and between adjacent projects." "…Landscaped or other open space areas shall constitute a portion of the parcel as required by the Zoning Ordinance and dictated by site features."	**Yes.** The Zoning Ordinance specifies that permitted uses within Public/Quasi-Public Zoning Districts shall comply with the City's adopted Design Guidelines and Specific Plans. See discussion below for 5.A.3 Streetscape Design.
	b. Setbacks Intent: "To provide space and distance for light and air, to enhance privacy and security, and to create space where landscaping can be established to buffer adjacent projects and screen undesirable views when needed or desired."	**Yes.** The project structures are set back a considerable distance from the northern and eastern property lines, creating a buffer area and space for landscaping to be installed in the future along the westward extension of Blue Oaks Boulevard and the re-routed (north) Philip Road, both of which would be constructed as part of the WRSP (see also the discussion for 5.A.3 below). The landscaping would provide a buffer and screen as it matures. On the south, the REP structures have been sited close to Phillip Road; however, the only existing use to the south is the PGWWTP. Furthermore, existing traffic on Phillip Road is light and in the future this portion of Phillip Road would become a private driveway for the REP and PGWWTP. The residence with the commercial dog kennel is the nearest existing residence to the REP site, located at a distance of 1125 feet from the center of the site. The house is surrounded by mature trees which would substantially screen views of the project. There is only one residence within one-half mile of the site with an unobstructed view of the project. Under the WRSP, General Industrial uses are planned west of the REP site.
	5.A.3 Streetscape Design Intent: "To create an area adjacent to the street where landscaping and pedestrian amenities can be established to create a public open space that expresses a common theme, provides a link among projects, and emphasizes the concept that landscaping is a key	**Yes.** Under the WRSP, the segment of Phillip Road immediately south of the site would become a private drive serving the REP and PGWWTP, and Phillip Road east of the site would be realigned to continue north instead of west. This section of Phillip Road would connect with Blue Oaks Boulevard to the north of the REP site, which would be extended west from Fiddyment Road. The three City-owned parcels that the REP

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		
Source	**Objective and Policy Descriptions**	**Consistency Determination**
	element of Roseville's overall community image." "...When not already established by a specific plan or other document, and where practical given existing conditions, the minimum setback width for establishing a streetscape should be 20 feet, measured from the ultimate back of curb."	site is part of are adjacent to these future roads. The AFC states that as an adjacent developer to the WRSP, RE would be responsible for landscaping within the landscape easements on the south side of Blue Oaks Boulevard, and the west side of Phillip Road. The WRSP specifies a 25-foot wide landscape easement along the west side of Phillip Road and a 50-foot wide landscape easement along the south side of Blue Oaks Boulevard. The REP structures are set back sufficiently from the northern and eastern property boundaries to accommodate the specified landscape easements. RE has stated their intention of providing landscaping consistent with the Community Design Guidelines and the WRSP, which would be ensured by staff's proposed condition **VIS-5**.
	5.A.6 Grading Intent: "To minimize the amount of cut and fill required to prepare a site for development and to preserve and accentuate the relationship between the natural features of the site and the proposed building."	**Yes.** The REP would be cut and filled as required to provide a level site, situated slightly above the surrounding area. Consistent with this guideline, the applicant has stated that the amount of cut and fill would be the minimum amount necessary to achieve these objectives.
	5.A.7 Fencing Intent: "To provide physical separation, security and privacy between projects and noise attenuation through the provision of appropriately placed and sized fences and walls." "…Industrial sites that abut residential areas shall provide a minimum six foot high masonry wall along the boundary..."	**Yes.** The project is not adjacent to existing or future residential areas so a masonry wall is not necessary. For security purposes, the project site would be surrounded by an eight foot high chain link fence. Staff's proposed condition **VIS-6** would ensure that project fences are consistent with this guideline.
	5.A.8 Storage "Outdoor storage in industrial projects should be located to minimize visibility from public ways by utilizing landscaping and berming, building siting, screening, setbacks, and/or location."	**Yes**. The site plan provided in the AFC does not identify any outdoor storage areas. The AFC states that storage areas within the power plant would be located to minimize visibility and screened from view of public areas. **VIS-6** would ensure that any outdoor storage areas are designed consistent with this guideline.
	5.A.10 Trash/Recycling All refuse containers shall be placed within screened storage areas. Enclosure materials and color should be consistent with, and complimentary to, building materials and finishes.	**Yes**. The site plan does not depict the location of refuse containers. Consistent with this guideline, the applicant has stated that all refuse containers would be screened by solid fencing or walls and that the colors and materials of the enclosures would match adjacent buildings or structures. **VIS-6** would ensure that trash/recycling areas are designed consistent with this guideline.
	5.A.11 Landscaping Intent: To ensure that the characteristics of the site, with respect to soil type, topography, drainage patterns, and solar orientation are considered and incorporated into the landscape design, and to enhance the visual	**Yes.** In the AFC the applicant stated their intent to use plant materials that are drought tolerant and acclimated to the climate and type of soil in the project area. Plants would be selected to visually blend in with the natural landscape surrounding the site and to meet the City's water efficient landscape criteria. Condition **VIS-5** requires preparation and implementation of a landscape

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		Consistency Determination
Source	Objective and Policy Descriptions	
	image of Roseville by preserving and creatively blending the native and introduced landscape.	plan for the project to ensure that the project complies with City of Roseville LORS.
	b. Parking Lot Shading and Planter Requirements Intent: "To ensure the shading of parking lots and cars in the hot summer months to provide adequate planting and root zone space for shade trees, and to enhance the overall appearance of paved parking areas."	**Yes.** In the AFC the applicant stated that trees would be planted around the project parking area to provide shade. **VIS-5** requires the preparation and implementation of a landscape plan that is consistent with City of Roseville LORS.
	c. Landscape Screening: Intent: "To encourage the creative use of landscaping for effective screening, buffering and softening of various site elements."	**Yes.** In the AFC the applicant stated their intent to use primarily evergreen plant materials and to space plants appropriately to effectively screen the power plant. **VIS-5** requires the preparation and implementation of a landscape plan that is consistent with City of Roseville LORS.
	d. Landscape Maintenance Intent: "To maintain the original appearance of the landscaping over the long term, to ensure the health of the introduced plant materials so they will reach their natural maturity and to preserve the visual image of the community."	**Yes.** In the AFC the applicant stated that all installed landscaping would be professionally maintained per City of Roseville maintenance requirements. Trees would be pruned, re-guyed, berms rebuilt, weeds and trash removed, and the irrigation system repaired on a monthly basis. **VIS-5** requires maintenance of the landscaping for the life of the project and reporting of maintenance activities in the Annual Compliance Report.
	B. ARCHITECTURAL GUIDELINES 5.B.1 General Design Considerations Intent:"To promote high quality building designs that consist of durable and maintainable materials, that provide an aesthetically pleasing appearance to the public view."	**Yes.** Although not likely to be considered to have an "aesthetically pleasing appearance" by most viewers, the project structures would be painted or treated to visually blend with the surrounding environment, and surfaces would be treated so as not to create substantial glare. Condition **VIS-4** would require that the project structures be repainted as necessary to maintain a high-quality appearance for the life of the project. The condition requires yearly reporting on activities taken to maintain the structural surface treatments.
	5.B.3 Material and Finishes Intent: "To ensure the incorporation of a compatible variety of material and colors in building designs."	**Yes.** The project structures would be painted or treated to visually blend with each other and the surrounding environment.
	5.B.4 Screening Intent: "To screen undesirable view from public roads, adjacent properties and areas open to the public in a manner that is integrated with the overall building design."	**Yes.** The project would be visible from Phillip Road and adjacent properties, but because the traffic level and resident population in the area is currently so low, staff does not believe landscape screening is necessary prior to the start of operation of the project. There is only one residence within one-half mile of the REP site that would have an unobstructed view of the project. In the future, the project would be visible from the westward extension of Blue Oaks Boulevard and the realigned Phillip Road, both of which would be constructed as part of the WRSP. The traffic on these future roads would be substantially greater than existing traffic on Phillip Road. The REP would likely be considered an "undesirable" view

Visual Resources Table 3
Staff's Determination of the Project's
Consistency with Visual Resources-Related Local LORS

LORS		
Source	**Objective and Policy Descriptions**	**Consistency Determination**
		that should be screened at that time. Therefore, staff has proposed condition **VIS-5** to require RE to install landscaping along the northern and eastern property lines coincident with the building of the adjacent future roads.
	5.B.5 Signage Intent: "To encourage thoughtful, integrated design themes and styles for project signage that conforms to the Roseville Sign Ordinance."	**Yes.** The AFC states that only the title of the power plant and the address of the project would be on the main identification sign, which would probably be wall-mounted on the south wall of the administration/control building, facing the street (existing alignment of Phillip Road). Furthermore, there would be very few directional signs, and the applicant is committed to designing them as unobtrusive as possible. Condition **VIS-6** would ensure that signs conform to the Roseville Sign Ordinance.
	C. LIGHTING GUIDELINES Intent: "To improve the appearance of the City by creating livelier, friendlier, safer spaces through the artful illumination of buildings, streetscape, walkways, plazas, public art and other highlights." "Lighting shall comply with the Building Security Ordinance, enhance safety and security, and should give consideration to energy efficiency, color rendition and overall effect." Lighting sources should be thoughtfully located and shall have cut off lenses to avoid light spillage and glare on adjacent properties.	**Yes.** The applicant intends on complying with the Building Security Ordinance. Lighting would only be used for safety, security and operational purposes. Lighting fixtures would be very durable being of an industrial design. All light fixtures would be equipped with hoods and/or cut-off lenses and directed downward to avoid light spillage onto adjacent properties. The applicant does not intend on using accent lighting to enhance buildings or major structures as this is an industrial project. Staff's proposed **VIS-3** requires review and approval by Energy Commission staff of a lighting mitigation plan.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

PUBLIC COMMENTS

Bruce Singer: "I am a resident of West Roseville. I favor the construction of the Roseville Energy Park (REP). I believe it will be a great asset to the City, and will be a great support to the citizens. I suggest open "green-space" and a public access park be created for some of the surrounding land. Trees, and burms [sic] around the REP to provide screening would be good, too." (Mr. Singer's comment was sent to the Public Advisor's Office via e-mail on January 22, 2004.)

Response: A brochure published in May 2003 by Roseville Electric describes uses of the 40-acre REP site in addition to the natural gas fired generation facility currently being reviewed by the Energy Commission. RE also envisions building a large solar photovoltaic array and a Community Energy Center at the REP site. The conceptual

*illustration in the brochure shows the Community Energy Center situated in a park-like setting with trees, grassy areas, and a pond. The recently approved West Roseville Specific Plan (WRSP) includes several regional parks (including one that is 91 acres in size), numerous pocket parks, and passive open space areas that will serve recreational needs as West Roseville grows. As required by staff's proposed Condition of Certification **VIS-5**, landscape screening would be planted along the northern and eastern property boundaries coincident with the construction of the westward extension of Blue Oaks Boulevard and the rerouting of Phillip Road to the north, both of which would be completed as part of the build out of the WRSP. The landscaped areas could include berms in addition to trees and shrubs.*

AGENCY COMMENTS

Roseville Electric

Roseville Electric submitted their initial comments on the PSA on July 16, 2004 prior to the PSA Workshop.

Comment: "Page 4.12-12-16, Staff's Plume Impact Assessment – RE is unable to evaluate and discuss Staff's methodology for plume impact assessment because Staff utilized a new model for assessment. RE requests that Staff transmit the model including all input and output files and any discussion of assumptions in order for RE to understand Staff's methodology. RE is surprised by Staff's prediction of frequency and size of the plume."

*Response: Staff used the Combustion Stack Visible Plume (CSVP) to model both the cooling tower and the turbine/HRSG exhausts. The CSVP model was developed by Kirk Winges of MFG, Inc. a consultant to the original Pastoria Power Project. Energy Commission staff first started testing the CSVP model and reviewing its code in the first quarter of 2001, when the first corrections to the executables were made to allow the modeling of plume sources with exhaust temperatures above 212 degrees Fahrenheit. CSVP has been used on all exhausts (e.g., cooling towers, HRSGs) with water vapor plume potential since that time, with SACTI being initially used along with CSVP for the cooling towers but later being phased out for visual impact analyses (SACTI is still used for ground fogging traffic impact studies). In all, staff has used CSVP on over 34 siting cases (including the REP). Staff transmitted a copy of the model and all of the input and output files to the applicant. **Appendix VR-2** discusses several reasons why staff believes the CSVP model predicted greater plume frequencies and sizes than predicted by the Seasonal/Annual Cooling Tower Impact Program (SACTIP) employed by the applicant.*

Comment: "Page 4.12-30, Proposed Condition of Certification **VIS-2** – Staff has concluded that the REP will not result in significant visual impacts yet requires specific landscaping requirements. At a minimum, VIS-2 should be modified to reflect that any landscaping should be performed in accordance with requirements of the City of Roseville. Therefore VIS-2 should be modified as follows.

> **VIS-2** The project owner shall provide landscaping ~~along the four boundaries of the REP property that is effective in screening the proposed project from~~

~~public views and~~ that is consistent with the City of Roseville Community Design Guidelines."

*Response: Staff has modified the landscaping condition (previously VIS-2, now **VIS-5**) accordingly.*

Comment: "Page 4.12-31, Proposed Condition of Certification **VIS-3** – RE requests the following modifications for clarity.

VIS-3 To the extent feasible and consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting such that a) lamp~~s~~ and reflector~~s~~ visibility is minimized from public viewing areas ~~are not visible from 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) the plan complies with local policies and ordinances. The project owner shall submit to the CPM for review and approval and simultaneously to the City of Roseville for review and comment a lighting ~~mitigation~~ control plan that includes but is not necessarily limited to the following:

a) Determination of location and direction of light fixtures shall take the lighting ~~mitigation~~ control requirements into account.

b) Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting ~~mitigation~~ control requirements.

A corresponding change to the verification should be made replacing the word 'mitigation' with 'control.'"

Response: Chapter 19.16 of the Roseville Zoning Ordinance specifies that land uses and structures in the Public/Quasi-Public zoning district shall comply with the City's adopted design guidelines. The Community Design Guidelines specify that light fixtures "shall have cut off lenses to avoid light spillage and glare on adjacent properties" (emphasis added). City Condition #6 proposed by the Roseville Community Development Department (and discussed further below) specifies that "Lighting sources should be thoughtfully located and shall have cut off lenses to minimize light spillage and glare on adjacent properties." The properties adjacent to the REP site are not "public viewing" areas, so acceptance of the applicant's proposed language (i.e., "lamp and reflector visibility [shall be] minimized from public viewing areas") would cause the project to be inconsistent with the more restrictive language of the City LORS and Condition. Therefore, staff does not accept this change proposed by the applicant. It should be noted that because the security of power plants in California is a major concern, VIS-3 does allow light trespass in the areas immediately outside the project boundaries if it is determined necessary for the security of the facility. As requested, the word "mitigation" has been replaced with the word "control."

Comment: "Page 4.12-32-33, Proposed Condition of Certification **VIS-4** – RE requests deletion of the condition. RE will submit proposed colors and treatments prior to the

FSA. Staff should be able to approve the colors and treatment proposed for the REP major components in its FSA negating the requirement for treatment plan approval during the compliance phase. RE is proposing this new approach due to the difficulty and length of time experienced by other projects during the compliance phase in obtaining timely approval of a treatment plan."

Response: A surface treatment plan for the REP has not been provided to staff; therefore, VIS-4 remains. Please also see staff's response to RE's comment on VIS-4 received on September 10, 2004.

RE submitted supplemental PSA comments on August 11, 2004.

Comment: "Page 4.12-12-4.12-16, Visual Plumes – Subsequent to the PSA Workshop, Staff transmitted additional information relating to its visual plume assessment. RE has reviewed the material and believes that Staff's approach overestimates the frequency and size of plumes that may be generated form the facility. First, RE believes that the SACTIP should be used to assess visual plume statistics. Second, RE believes that the key components of the analysis should not just be whether a plume can form, but should also include a significance threshold to determine whether a visible plume can be considered a significant impact to visual resources within the area. For example, Staff's statistics include hours of visible plume formation within a distance that is less than the diameter of the cooling tower shroud. At this point the plume has just left the top of the cooling tower cell and is still completely saturated. Third, the SACTIP model was never intended to model HRSG stack plumes, and needs substantial modification to obtain useful results. We are in the process of making these needed modifications. Additionally, Staff's analysis does not take into account that small plumes (dimensions of which are less than the cooling tower length, width, or height) would dissipate quickly and not be significant. Staff's plume analysis also assumed much more duct firing and hours of operation for the REP than currently proposed. RE is currently completing its own visual plume analysis, which will be docketed under separate cover. Based on our initial SACTIP modeling results, RE believes that visible plumes will not significantly impact visual resources because the predicted plume size is small relative to the REP structures and the predicted probability of visible plume formation is low when considering that a visible plume will only be noticed during daylight hours when adverse weather conditions are not present, such as fog, low ceilings and rain."

Response: Staff's detailed responses to the comments above are found in the subsection entitled "Impacts of Cooling Tower and Combustion Exhaust Plumes" and ***Appendix VR-2****, which includes staff's full plume modeling report. In our responses, staff's addresses the applicant's claim that the CSVP model used by staff overestimates plume frequency and discusses critical flaws in the applicant's SACTIP modeling and fundamental problems with the SACTIP model itself. In addition, staff has more fully discussed the analytical methodology and significance threshold used for determining visible plume impacts.*

Comment: "Page 4.12-30, Proposed Condition of Certification **VIS-2** – RE suggested modifications to VIS-2 in its Preliminary Comments on the PSA. At the Public Workshop, Staff and RE discussed it would not be necessary for RE to install landscaping on all four sides of the REP under the West Roseville Specific Plan

Guidelines. RE explained that landscaping on the western site boundary would not be required because the only potential viewer from the west would be industrial facilities. Residential areas planned further west would view the industrial area, which will block the REP from view. Landscaping is not necessary on the southern boundary because immediately south of the REP site is the PGWWTP. Landscaping between these two industrial facilities would be burdensome and would provide no visual benefit. Thus, under the WRSP Guidelines, landscaping would only be required along the future re-routing of Phillip Road to the east of the site, and along the future extension of Blue Oaks Boulevard, to the north of the site, consistent with the timing of the future development of these two roadways.

Also at the PSA Workshop, RE described other details in the WRSP Guidelines that would be employed by developers in the area. RE believes that as long as the REP is consistent with these guidelines, the Staff can make a finding that the REP will comply with the local LORS. While a portion of the WRSP Guidelines were included as an attachment to Data Responses, we have docketed the full WRSP on August 3, 2004 for Staff's reference. We trust that this information would enable Staff to adopt the proposed modifications to **VIS-4** suggested by RE in its Preliminary Comments on the PSA.

Response: Staff's proposed condition VIS-2 has been modified to only require landscaping along the north and east property boundaries, coincident with the construction of the Blue Oaks Boulevard extension and re-routed Phillip Road and consistent with the WRSP Design Guidelines for streetscapes. With staff's proposed conditions of certification, staff believes the project would be built in accordance with the city's adopted design guidelines for industrial uses. The applicant dropped their original comments on VIS-4 referred to above. The applicant's current comments on VIS-4 are addressed below.

RE submitted their final proposed revisions to staff's proposed condition **VIS-4** (Surface Treatment of Project Structures and Buildings) on September 10, 2004. The applicant's modifications to VIS-4 are shown below in underline/strikeout.

Comment:

VIS-4 Prior to the start of commercial operation, the project owner shall treat the surfaces of all major project structures and buildings conventionally receiving color treatment and visible to the public with colors indicated in the AFC such that a) their color(s) minimize(s) visual intrusion and contrast by blending with the landscape; b) their ~~colors and finishes~~ surfaces do not create excessive glare; and c) ~~their colors and finishes are~~ the treatment is consistent with local policies and ordinances. ~~Corrugated or embossed-type aluminum lagging shall be used where lagging would be visible offsite. Structures shall have embossed or corrugated surfaces where feasible.~~ The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-refractive. The project owner shall submit for CPM review and approval, and to the City of Roseville for review and comment, a specific surface treatment plan whose proper implementation will satisfy these requirements. 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;~~ the 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 treatment proposed for use on project structures, including structures treated during manufacture, from Key Observation Points 1 and 2, whose locations are shown on Figure 2 in the Staff Assessment;

e) A specific schedule for completion of the treatment; and

f) A procedure to ensure proper treatment maintenance for the life of the project.

The project owner may, at its own risk, order equipment with final factory surface treatment prior to approval of the treatment plan. If the CPM does not approve the treatment plan, the project owner shall have the equipment modified at its expense, as necessary, to obtain the required approval. Under no circumstances shall the project owner install equipment that has final surface treatment at the project site prior to CPM approval of the treatment plan. The project owner may order and install any equipment that has no factory surface treatment or only primer surface treatment and which will receive final surface treatment at the site, in accordance with the treatment plan. The project owner shall not ~~specify to the vendors the treatment of any buildings or structures treated during manufacture, or~~ perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 60~~90~~ days prior to ordering ~~specifying to the vendor the color(s) and finish(es) of~~ the first structures or buildings that are 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 Roseville 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) within 30 days of receiving notification that revision is required.

Prior to 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 they are

ready for inspection~~, and shall submit one set of 11" x 17" color photographs taken from the same key observation points identified in (d) above~~.

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.~~

Response: Staff does not agree with many of the applicant's proposed changes to VIS-4. First of all, the surface treatment condition was intended to address not only structures that are painted or color treated, but also aspects of the project that are not color treated, such as bare, aluminum pipe lagging. The applicant responded to Data Request #66 that "aluminum lagging visible offsite will be the corrugated or embossed type, to reduce glare and reflection. Where feasible, areas visible off site will be treated with non-reflective surfaces, including non-reflective paints, and embossed or corrugated surfaces, where these are available." Based on the applicant's response to the data request, staff incorporated these specific requirements into VIS-4. RE did not provide an explanation for the proposed changes to VIS-4, nor has the applicant provided information to suggest that these measures are infeasible or unavailable. Secondly, the applicant's proposed changes to allow ordering structures with final surface treatments prior to approval of the plan by the CPM is not appropriate in this case. It is staff's recollection that a condition like this was allowed on a project that was on a very fast track for construction during the electricity crisis. Staff is confident that the REP color treatment plan can be processed during compliance in a timely fashion provided that a thorough plan is provided to technical staff to review. Staff can provide RE with a copy of a color treatment plan approved for a past project as an example of a thorough plan. VIS-4 has been modified as staff believes is appropriate.

City of Roseville Community Development Department

On August 18, 2004, the City of Roseville Community Development Department provided Energy Commission staff with a set of conditions of approval to ensure that the REP complies with City LORS. Those conditions relevant to visual resources are addressed below.

City of Roseville Condition #6: "The internal site development shall follow the City's standards for Industrial property as identified within the City of Roseville Community Design Guidelines. The following provisions, where practicable, will be implemented in the site planning, lighting and architecture for the facility as required by the City of Roseville Community Design Guidelines, and referenced below:

e. Lighting sources should be thoughtfully located and shall have cut off lenses to minimize light spillage and glare on adjacent properties.

f. Pole mounted lighting should be spaced for maximum energy efficiency.

g. A landscape and architectural plan shall be submitted to the City of Roseville Planning Dept. for approval prior to construction."

*Response: Staff's proposed condition **VIS-3** requires RE to submit a lighting plan for the CPM's review and approval and the City's review and comment, prior to ordering any permanent exterior lighting for the REP. Part e) of City Condition 6 is addressed by parts a), b), c), and d) of VIS-3. Staff's condition requires light fixtures to be located and designed so lamps (bulbs) and reflectors are not visible from beyond the project boundaries, except where it is determined that direct light outside the REP site is necessary for the security of the facility. Part f) of the city's condition has been added to VIS-3. Part g) is addressed by conditions **VIS-4** and **VIS-5**. VIS-4 and VIS-5 require RE to submit plans for structural surface treatment and landscaping for the CPM's review and approval and the City's review and comment prior to construction of the project. Requirements of City Condition #6 not listed here are addressed by staff's proposed condition **LAND-1** (see the **Land Use** section of the FSA).*

City of Roseville Condition #7: "A landscape and architectural plan for the streetscape of the facility shall be submitted to the City of Roseville Planning Dept. for approval prior to construction of the REP. Such plan shall be consistent with the West Roseville Specific Plan Design Guidelines for street landscaping for the re-routed Phillip Road and the Blue Oaks Boulevard extension, and shall be implemented when these respective roadways are constructed."

*Response: Staff's proposed condition **VIS-5** requires RE to submit a landscape plan for the CPM's review and approval and the City's review and comment prior to construction of the project. VIS-5 specifies that the landscaping shall be installed consistent with the WRSP Design Guidelines for landscaping along the re-routed Phillip Road and Blue Oaks Boulevard extension.*

City of Roseville Condition #22: This condition specifies that "the materials and colors" of trash enclosures and recycling areas "shall match the building."

*Response: The REP site plan provided in the AFC does not depict the location of refuse containers. The AFC states that RE would comply with Guideline 5.A.10 (Trash/Recycling) of the Community Design Guidelines, which reads: "All refuse containers shall be placed within screened storage areas. Enclosure materials and color should be consistent with, and complimentary to, building materials and finishes." **VIS-6** would ensure that trash/recycling areas are designed consistent with this guideline.*

City of Roseville Condition #38: "All on-site external lighting shall be installed and directed to minimize off-site glare. Lighting within the parking areas shall provide a maintained minimum of one (1) foot candle of light."

*Response: As previously discussed, staff's proposed condition **VIS-3** requires that external light fixtures are located, designed, and directed to minimize off-site glare (see parts a), b), c), and d) of VIS-3). The lighting level specified for parking areas has been incorporated into Part e) of VIS-3.*

City of Roseville City Manager's Office

Staff held a public workshop on September 8, 2004 to discuss, among other issues, the potential visual impacts of the REP visible water vapor plumes on future viewers in

West Roseville. In the PSA, staff raised the concern that the plumes may be perceived as unappealing by visually sensitive viewers and could have negative impacts on the future residential neighborhoods, open space areas and regional parks that will be developed in the areas surrounding the REP site. At the workshop, staff sought the City's input on this issue and requested a formal letter from the City stating their official position on the matter.

On September 29, 2004 staff received a letter signed by Mr. W. Craig Robinson, the City Manager of Roseville. Mr. Robinson's letter indicates that the City's position on this issue is based upon their review of the PSA, the AFC, the visible plume modeling conducted by RE's consultant, and City staff's participation in the September 8th workshop. The City Manager's letter states that the City does not have any specific LORS that would directly prohibit vapor plumes. In addition, the letter states that the City has in the past permitted uses that emit vapor plumes in industrial zones that are in close proximity or adjacent to residential uses.

Comment: "CEC Staff concluded in its PSA that the potential for vapor plumes to cause significant impacts to existing viewers is less than significant. The City agrees with this analysis. We now understand that CEC Staff believes that with the development of the WRSP area and its addition of more potential viewers, there is an increased potential for the same water vapor plumes to result in significant visual impacts to these new viewers. The majority of these new viewers will move into the WRSP area after the REP is constructed and operating. Therefore, for the majority of these new viewers, their existing view will include any water vapor plumes from the REP. In other words, the REP cannot result in degradation of views for the majority of new residences.

While a small minority of new residents could move into the area and enjoy a view without any water vapor plumes from the REP, this plume-free view will last for a period of at most, one to two years. The West Roseville Specific Plan (WRSP) was adopted with the specific identification of a future power plant located at the REP site. The City required this fact to be disclosed in all CC&Rs recorded for the WRSP. For the early residents, since the WRSP will be undergoing development at the same time, their view will be consistently changing. Also, it is important to understand that the WRSP area is relatively flat, with no appreciable view towards the horizon. With buildout of the WRSP anticipated to occur from Fiddyment Road and moving west with the installation of roads and infrastructure, views towards the western horizon will be largely blocked by new homes, landscaping, etc. The view that may be affected would be the view of sky as opposed to the view of a mountain, river or a valley from an elevated point. Since this unobstructed view of the sky will be temporary and will be modified by the development in the area and will only affect a small amount of potential viewers, the City believes that the potential visual impact from the REP water vapor plume is less than significant. In addition, the cost to abate the plume clearly outweighs its minor, temporary less-than-significant impacts."

Response: Staff has revised its plume modeling analysis to reflect actual power demand data for the City of Roseville and the reduced operating schedule for the REP. As a result of this new information, the modeled vapor plume frequencies and plume dimensions have lowered from those reported in the PSA. To assess the impacts of the plumes on future West Roseville viewers, staff prepared several visual simulations of

the expected water vapor plumes. Please see the discussion regarding plume impacts on future viewers in the subsection entitled Impacts of Cooling Tower and Combustion Exhaust Plumes.

CONCLUSIONS AND RECOMMENDATIONS

With effective implementation of RE's proposed mitigation measures as described in the AFC and supplements thereto, and staff's proposed conditions of certification, the REP would cause less than significant direct and cumulative visual impacts and would be consistent with applicable visual resources-related LORS. Staff recommends that the Energy Commission adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

CONSTRUCTION LIGHTING

VIS-1 The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

a) All lighting shall be of minimum necessary brightness consistent with worker safety and security;

b) All fixed position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and direct light trespass (direct light extending outside the boundaries of the power plant site or the site of construction of ancillary facilities);

c) Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use; and

d) If the project owner receives a complaint about construction lighting, the project owner shall notify the CPM and shall use the complaint resolution form shown in the General Conditions section of the Compliance Plan to record each lighting complaint and to document the resolution of that complaint. The project owner shall provide a copy of each complaint form to the CPM.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection.

If the CPM notifies the project owner that modifications to the lighting are needed to minimize impacts, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.

Within 48 hours of receiving a lighting complaint, the project owner shall provide to the CPM a) a report of the complaint; b) a proposal to resolve the complaint; and c) a schedule for implementation of the proposal. The project owner shall provide a copy of

the completed complaint resolution form to the CPM in the next Monthly Compliance Report.

VISIBLE WATER VAPOR PLUMES

VIS-2 To ensure that the cooling tower plumes will not cause significant visual impacts, the project owner shall ensure that the cooling tower is designed and operated as certified.

The cooling tower shall be designed and operated so that that the exhaust air flow rate per heat rejection rate:

GTX Configuration

(1) will not be less than 25.4 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 41 degrees F and 80 degrees F; (2) will not be less than 19 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are below 41 degrees F (assuming only three cooling tower cells in operation); and (3) will not be less than 13.6 kilograms per second per megawatt when operating with duct firing and the ambient temperatures are below 80 degrees F.

LM6000 Configuration

(1) will not be less than 32.6 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 55 degrees F and 80 degrees F; (2) will not be less than 24.5 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are between 41 degrees F and 55 degrees F (assuming only three cooling tower cells in operation); (3) will not be less than 16.1 kilograms per second per megawatt when operating without duct firing and the ambient temperatures are below 41 degrees F (assuming only two cooling tower cells in operation); and (4) will not be less than 14.4 kilograms per second per megawatt when operating with duct firing and the ambient temperatures are below 80 degrees F.

Verification: At least 90 days prior to ordering the cooling towers, the project owner shall provide to the CPM for review the final design specifications of the cooling tower related to plume formation. The project owner shall not order the cooling tower until notified by the CPM that the two design requirements above have been satisfied.

The project owner shall provide written documentation in each Annual Compliance Report to demonstrate that the cooling towers have consistently been operated within the above-specified design parameters, except as necessary to prevent damage to the cooling tower. If determined to be necessary to ensure operational compliance, based on legitimate complaints received or other physical evidence of potential non-compliant operation, the project owner shall monitor the cooling tower operating parameters in a

manner and for a period as specified by the CPM. For each period that the cooling tower operation monitoring is required, the project owner shall provide to the CPM the cooling tower operating data within 30 days of the end of the monitoring period. The project owner shall include with this operating data an analysis of compliance and shall provide proposed remedial actions if compliance cannot be demonstrated.

PERMANENT EXTERIOR LIGHTING

VIS-3 To the extent feasible and consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting such that a) lamps and reflectors are not visible from 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) the plan complies with local policies and ordinances. The project owner shall submit to the CPM for review and approval and simultaneously to the City of Roseville Planning Department for review and comment a lighting control plan that includes but is not necessarily limited to the following:

a) Determination of location and direction of light fixtures shall take the lighting control requirements into account.

b) Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting control requirements.

c) Lighting design shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated.

d) Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security.

e) All lighting shall be of minimum necessary brightness consistent with operational safety and security. Lighting within the parking areas shall provide a minimum of one (1) foot candle of light;

f) Pole mounted lighting should be spaced for maximum energy efficiency;

g) 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; and

h) If the project owner receives a complaint about lighting, the project owner shall notify the CPM and shall use the complaint resolution form shown in the General Conditions section of the Compliance Plan to record each lighting complaint and to document the resolution of that complaint. All records of lighting complaints shall be kept in the on-site compliance file. The project owner shall provide a copy of each completed complaint form to the CPM.

i) The lighting plan shall describe proposed technical methods to address any lighting complaints.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to discuss the documentation required in the lighting control 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 Roseville Planning Department for review and comment a lighting control plan that describes the measures to be used and demonstrates that implementation of the plan will satisfy the requirements of the condition.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) within 30 days of receiving notification that revision is required.

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 completed 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 48 hours of receiving a lighting complaint, the project owner shall provide to the CPM a) a report of the complaint; b) a proposal to resolve the complaint; and c) a schedule for implementation of the proposal. The project owner shall provide a copy of the completed complaint resolution form to the CPM within 30 days of complaint resolution, and retain a copy in the project owner's compliance file.

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-4 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their color(s) minimize(s) visual intrusion and contrast by blending with the landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. Corrugated or embossed-type aluminum lagging shall be used where lagging would be visible offsite. Structures shall have embossed or corrugated surfaces where feasible. Transmission line conductors shall be non-specular and insulators shall be non-reflective and non-refractive. The project owner shall submit to the CPM for review and approval, and to the City of Roseville Planning Department for review and comment, a specific surface treatment plan whose proper implementation will satisfy these requirements. 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, and pipe; the 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 treatment proposed for use on project structures, including structures treated during manufacture, from Key Observation Points 1 and 2, whose locations are shown on Figure 2 in the Final Staff Assessment;

e) A specific schedule for completion of the treatment; and

f) A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 60 days prior to specifying to the vendor the color(s) and finish(es) of the first structures or buildings that are 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 Roseville Planning Department 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) within 30 days of receiving notification that revision is required.

Prior to 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 they are ready for inspection, and shall submit one set of 11" x 17" color photographs taken from the same key observation points identified in (d) above.

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.

LANDSCAPE SCREENING

VIS-5 The project owner shall install landscaping that complies with the West Roseville Specific Plan Design Guidelines for street landscaping for the re-routed Phillip Road and the Blue Oaks extension. The landscaping shall be installed when these respective roadways are constructed. The project owner shall maintain the landscaping for the life of the project, including providing any needed irrigation, removing debris on an annual or semi-annual basis, and replacing dead or dying vegetation.

The project owner shall submit to the CPM for review and approval and simultaneously to the City of Roseville Planning Department 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 from the CPM.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to the City of Roseville Planning Department for review and comment prior to the start of construction of the REP.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and the City of Roseville a revised plan for review and approval by the CPM.

Installation of the landscaping shall not commence until the CPM authorizes final approval and shall be completed immediately following construction of the re-routed Phillip Road and Blue Oaks extension. The project owner shall simultaneously notify the CPM and the City of Roseville within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

FENCES, SIGNS, AND STORAGE, TRASH AND RECYCLING AREAS

VIS-6 The project owner shall ensure that fences, outdoor storage areas, and trash/recycling areas are designed and visually screened consistent with the City of Roseville Community Design Guidelines. Project signs shall be designed consistent with the City of Roseville Sign Ordinance. Signs required by safety regulations shall conform to the design criteria established by those regulations.

Verification: At least 60 days prior to construction of the power plant, the project owner shall provide to the CPM for review and approval, and simultaneously to the City of Roseville Planning Department for review and comment, information that will demonstrate that fences, storage areas, trash/recycling areas, and signs will be designed consistent with City LORS.

The project owner shall not construct these elements of the project until the project owner receives approval of the submittal from the CPM.

If the CPM notifies the project owner that revisions are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

REFERENCES

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City of Roseville Community Design Guidelines. Adopted December 6, 1995.

City of Roseville Municipal Code, Title 19, Zoning.

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City of Roseville Community Development Department (CRCD) 2004a. Major Project Conditions of Approval. Submitted to the Docket on August 16, 2004.

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Roseville Electric, Roseville, California (Roseville) 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

Smardon, Richard C., James E. Palmer, and John P. Felleman. 1986. Foundations for Visual Project Analysis. John Wiley & Sons. New York.

Walters, William, and Lisa Blewitt. Visible Plume Analysis for Roseville Energy Park. Modeling analysis prepared by William Walters and Lisa Blewitt of Aspen Environmental Group for Energy Commission staff. October 2004.

APPENDIX VR-1: STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff's analysis of potential impacts to Visual Resources caused by construction or operation of any power plant or related facility largely involves answering the four questions found in Appendix G of the CEQA Guidelines, under Aesthetics. The four questions that must be addressed regarding whether the potential impacts of a project are significant are:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

The visual analysis typically distinguishes between three different impact durations: temporary impacts, typically lasting no longer than two years; short-term impacts, generally last no longer than five years; and long-term impacts, which are impacts with a duration greater than five years. In general, short-term impacts are not considered significant.

In addition to visiting the project area for personal observation of how and whether a particular view is experienced, staff also searches for other evidence to determine if the local community values a particular view that might be affected by the project. This includes searching the applicable planning documents covering the area produced by local governments and community groups, as well as searches for any other type of evidence showing whether valued scenic vistas exist within the project's viewshed. Staff relies primarily on personal observation of the project site to make initial determinations of visual character or quality of the area, in comparison with all other landscapes in California, but also gives due deference to official statements by elected governmental bodies concerning the value of visual resources within the project area.

Staff answers each of the four checklist questions for each part of the project both during construction and during operation, including any related facility such as a transmission line or gas pipeline. To answer the first checklist question (Would the project have a substantial adverse effect on a scenic vista?), staff must determine if any such scenic vista exists within the viewshed of the various aspects of the project, and then determine if the project would have a substantial adverse effect on that vista.

To help make these determinations, visual resource professionals often answer a series of questions developed to help focus the analysis, and examine various ways that the project could create an impact to scenic vistas. The Energy Commission's Visual Resources staff has developed such a list for each of the four CEQA guideline questions, drawing upon published methodologies and academic resources (Smardon,

et al.), as well as on past experience with other power plant siting cases. Questions developed to help determine whether the project would significantly affect a scenic vista include:

1. Is the project located in the scenic view of a local/state/federal-designated scenic vista?
2. Is there compelling evidence to show that the view is designated/valued by the local community?
3. Will the project eliminate or block views of valuable visual resources?
4. Would the project create a water vapor plume that could have an adverse effect on a state/federal/local-designated scenic vista?

To help answer the second CEQA checklist question above (Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?), staff developed the following questions:

1. Is the project located in the scenic view from a local/state/federal-designated scenic highway?
2. Does the project site or its immediate vicinity contain scenic resources, such as trees, rock outcroppings, or historic structures that could be damaged by the project?
3. Would the project create a water vapor plume that could have an adverse effect on the view from a local/state/federal-designated scenic highway?

To answer the third question (Would the project substantially degrade the existing visual character or quality of the site and its surroundings?), staff assesses the existing visual character and quality of the project area, and then determines how the project would affect the character and quality of the project viewshed. To assess whether the project has the potential to substantially degrade the present visual character or quality, staff uses personal observation and such tools as visual simulations to determine if an impact is significant and mitigation is required to reduce the impact to a less-than-significant level. To make that determination, staff examines many factors, such as: how many viewers can see a particular view and for how long, collectively called “viewer exposure”; and to what degree would the project change the aspects of a given view, such as whether the project’s components would block a particular view.
To help determine how the community rates and values the visual character and quality of a given site, and whether the project would substantially alter the present visual character or quality, staff developed the following questions:

1. How many residential, recreational, and traveling (motorist) viewers have views of the project?
2. Is the project site properly zoned?
3. Would a conditional use permit and/or height variance have been required from the city/county (if so what conditions would the city/county place on the power plant)?
4. Does the project conform to the clear written declarations of local/state/federal agencies to protect designated visual resources of importance or the valued

aesthetic character of a neighborhood (said declaration must be clear, concise, and uncompromised by conflicting declarations, and be an official action of the governing body (City Council/Board of Supervisors) such as a General Plan element, zoning ordinance, or design guideline)?

5. Will the project substantially alter the existing viewshed, including any changes in natural terrain?
6. Does the project substantially change the existing setting?
7. Has the applicant proposed landscaping?
8. Would the project create a water vapor plume that could have an adverse effect on a KOP view?

The process of answering these questions includes an examination of the present views within the project viewshed in terms of aesthetics – i.e., by examining the various aspects that together define the quality of a view – followed by an assessment of how the various aspects of the aesthetics of the view would be affected by the project, which conversely could be described as an analysis of how well the project area can absorb the various aspects of the project into the landscape.

To answer the fourth CEQA Guidelines 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?), staff analyzes the project's lighting plans to ensure they fit with established norms for low-impact lighting designs, and then answers the following questions to determine if a potential for impact from night-lighting exists:

1. With the Energy Commission's standard condition of certification for lighting control, would light or glare be reduced to acceptable levels?
2. Will the project result in significant amounts of backscatter light into the nighttime sky?

APPENDIX VR-2

VISIBLE PLUME ANALYSIS

William Walters and Lisa Blewitt

INTRODUCTION

The following provides the assessment of Roseville Energy Park (REP) cooling tower and turbine/heat recovery steam generator (HRSG) exhaust stack visible plumes. Staff completed a modeling analysis for the Applicant's proposed unabated cooling tower and turbine/HRSG designs.

PROJECT DESCRIPTION

The Applicant has proposed a linear 4-cell mechanical-draft cooling tower. The applicant has not proposed to use any methods to abate visible plumes from the cooling towers.

The project includes two potential configurations with two separate gas turbine/HRSG systems, each with separate exhaust stacks. The proposed gas turbines will either be Alstom GTX 100 or General Electric LM 6000 PC Sprint type engines. The Applicant has not proposed to use any methods to abate visible plumes from the HRSG exhausts.

The project also includes a small auxiliary boiler. There is the potential for occasional visible plumes from the auxiliary boiler; however, the auxiliary boiler is forecast to operate less than 1,000 hours per year and less than 300 hours during the first and fourth quarters. Therefore, the auxiliary boiler will not be used often enough to cause a significant visible plume frequency, and no modeling analysis of the auxiliary boiler visible plume frequency has been completed.

VISIBLE PLUME MODELING METHODS

PLUME FREQUENCY AND DIMENSION MODELING

The CSVP model was used to estimate plume frequency and plume dimensions for the cooling tower and turbine/HRSG exhausts. This model provides conservative estimates of both plume frequency and plume size. This model uses both hourly exhaust parameters and ambient condition data to determine the plume frequency. This model is based on the algorithms of the Industrial Source Complex model (Version 2), that determine conditions at the plume centerline and this model does not incorporate building downwash.

The modeling method combines the cooling tower exhausts into an equivalent single stack. This method may overestimate cooling tower plume size (particularly height) during plume hours with higher winds due to little cell interaction and the potential for building downwash, but will be more accurate during low wind and calm periods when the exhausts from the cooling tower cells will combine into one coherent body. Wind speeds are set to 1 m/s during calm hours.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20% of seasonal (October through March for this case) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

> The Energy Commission has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set[1] used in the analysis categorizes total sky cover and opaque sky cover in 10% increments. Staff has included in the "Clear" category a) all hours with total sky cover equal to or less than 10% plus b) half of the hours with total sky cover 20-100% that have sky opacity equal to or less than 50%. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100% and the opacity of sky cover is relatively low (equal to or less than 50%), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the "clear" sky definition.

If it is determined that the seasonal daylight clear hour plume frequency is greater than 20% then plume dimensions are determined and a significance analysis of the plumes is included in the Visual Resources section of the Staff Assessment.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

COOLING TOWER DESIGN AND OPERATING PARAMETERS

The following cooling tower design characteristics, presented below in **Table 1**, were determined through a review of the applicant's AFC (RE 2003, Appendix 8.1-D) and data responses (RE 2004a, responses #68 and #69). The applicant was asked if any safety margins should be applied to the cooling tower design, in the case that staff may seek to require the design to be built as modeled and analyzed; and were also asked to clarify the estimated ambient conditions that would cause one or two of the cooling tower cells, depending on the turbine/HRSG configuration, to be turned off. The answers to these questions were used, updating the information provided in Appendix

[1] This analysis uses a Sacramento Airport Hourly United States Weather Observations (HUSWO) meteorological data set obtained from the NCDC.

8.1-D, to provide the cooling tower design data presented in Table 1. The data presented in this table was used to model the cooling tower plume frequency and dimensions.

Table 1 – Cooling Tower Operating and Exhaust Parameters

Parameter		Cooling Tower Design Parameters		
Number of Cells		4 (1 x 4)		
Stack Height (Cell Cone Height)		13.4 meters (44 feet)		
Cell Stack Diameter		9.6 meters (31.6 feet)		
Case	**Inlet Air Ambient Condition**	**Heat Rejection Rate (MW)**	**Exhaust Flow Rate (lbs/s/cell)**	**Exhaust Temperature (°F)(2)**
Alstom GTX100 Turbine/HRSG Design – No Duct Firing (1)				
1	99°F, 26.8% RH	99.9	1,400	88.51
2	62°F, 64.4% RH	99.9	1,439	76.78
3	48°F, 91.3% RH	99.9	1,459	71.53
4	32°F, 81.4% RH (3)	104.5	1,465	71.00
Alstom GTX100 Turbine/HRSG Design – With Duct Firing (1)				
1	99°F, 26.8% RH	182.5	1,369	99.02
2	62°F, 64.4% RH	182.5	1,402	89.95
3	48°F, 91.3% RH	182.5	1,416	86.05
4	32°F, 81.4% RH	182.5	1,441	79.23
LM6000 PC Sprint Turbine/HRSG Design – No Duct Firing (1)				
1	99°F, 26.8% RH	78.0	1,410	85.27
2	62°F, 64.4% RH	80.6	1,451	73.24
3	48°F, 91.3% RH (4)	80.6	1,453	73.10
4	32°F, 81.4% RH (4)	81.6	1,451	75.78
LM6000 PC Sprint Turbine/HRSG Design – With Duct Firing (1)				
1	99°F, 26.8% RH	173.4	1,372	98.05
2	62°F, 64.4% RH	161.2	1,412	86.86
3	48°F, 91.3% RH	162.2	1,426	82.77
4	32°F, 81.4% RH	162.2	1,451	75.56

Source: AFC (RE 2003a, Appendix 8.1-D and 8.1-H) and Data Request Response #68 and #69 (RE 2004a).
Notes:

(1) For CSVP modeling, values were extrapolated or interpolated between data points as necessary.
(2) Margined exhaust temperatures were not provided in the data response, they were calculated based on the margined flow and heat rejection values.
(3) Only three of the four cooling tower cells will be operating at this condition. The cooling tower cell will be shutdown at approximately 41°F.
(4) Only three of the four cooling tower cells will be operating at 48°F and only two of the four cooling tower cells will be operating at 32°F. The first cooling tower cell will be shutdown at approximately 55°F and the second at approximately 41°F.

It should be noted that only 2 to 3 cooling tower cells could be operated at all times when operating without duct firing causing exhaust conditions that are more favorable for visible plume formation. Additionally, reducing the number of cells is a favorable operating condition in terms of reducing parasitic power consumption. Therefore, staff would like to note that while the applicant's cell operation assumptions were used in this analysis, these assumptions do not represent the most conservative plume modeling basis, and may also not represent the most favorable operating basis.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

Staff modeled the cooling tower plumes using the Combustion Stack Visible Plume (CSVP) model. **Table 2** provides the CSVP model visible plume frequency results for duct firing and non-duct firing operations using a four-year (1990-1993) meteorological data set, obtained from the National Climatic Data Center, from Sacramento Airport. These modeling results are then used to determine likely project plume frequency and size after consideration of the proposed project operating schedule.

Table 2 – Staff Predicted Hours with Cooling Tower Steam Plumes Sacramento 1990-1993 Meteorological Data

Case	Available (hr)	Alstom GTX100 Peaking		LM 6000 PC Sprint Peaking	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	34,980	25,062	71.6%	23,498	67.2%
Daylight Hours	17,865	9,150	51.2%	8,133	45.5%
Daylight No Rain No Fog	16,028	7,327	45.7%	6,313	39.4%
Seasonal Daylight Hours*	7,781	6,052	77.8%	5,554	71.4%
Seasonal Daylight No Rain No Fog*	6,123	4,396	71.8%	3,899	63.7%
Seasonal Daylight Clear**	3,475	2,186	62.9%	1,863	53.6%
Case	**Available (hr)**	**Alstom GTX100 Base**		**LM 6000 PC Sprint Base**	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	34,980	16,302	46.6%	15,201	43.5%
Daylight Hours	17,865	4,411	24.7%	4,167	23.3%
Daylight No Rain No Fog	16,028	2,643	16.5%	2,428	15.1%
Seasonal Daylight Hours*	7,781	3,388	43.5%	3,393	43.6%
Seasonal Daylight No Rain No Fog*	6,123	1,764	28.8%	1,783	29.1%
Seasonal Daylight Clear**	3,475	765	22.0%	804	23.1%

* Seasonal conditions occur anytime from October through March.
**Available hours based on seasonal daylight clear hours.

These results confirm that the visible plume formation occurs most predominately during the cold weather months. For the proposed cooling tower, the maximum temperatures where plume is expected to occur are 81°F (77% RH) and 75°F (90% RH) when operating with and without duct firing, respectively, based on the Alstom GTX100 Turbine/HRSG design. For the LM6000 PC Sprint Turbine/HRSG design, the maximum temperatures where plume is expected to occur are 75°F (90% RH) and 70°F (93% RH) with and without duct firing, respectively.

A plume frequency of 20% of seasonal (October through March) daylight clear hours is used as a plume impact study threshold trigger. Both plant designs show cooling tower plume frequencies greater than 20% at base load or peaking load conditions.

In order to determine potential plume frequencies and sizes for this project the anticipated operating schedule was used to determine how many hours of peaking and duct firing would occur. Peaking operations, based on the original project operating schedule provided in Table 8.1-10 of the AFC (RE 2003a), would be anticipated to occur frequently, over 46% of the year and almost one-half of the time the plant is in operation. For this original operating scenario, using the amount of duct firing forecast for the 1st and 4th quarters and using the City of Roseville power demand curve provided in their 2003 annual report (RE 2004b) the peaking hours were adjusted, from that used to provide the modeling results presented in the PSA, to assume that peaking

operations occur over 10 hours per day starting at 11 am daily during the 1st quarter and over 13 hours per day and during all daylight hours during the 4th quarter. This amounts to a reduction in the daytime duct firing hours assumption that was presented in the PSA, which assumed duct firing occurred during all daylight hours for both quarters.

The applicant is currently constrained due to air permit restrictions, so a second operating profile has also been evaluated. For the second reduced operating schedule it is assumed that there is on average 6 hours per day of duct firing running, and based on their 2003 annual report (RE 2004b) the duct firing would occur from 1 pm through 7 pm daily. However, staff believes that it is the intent of the applicant to be able to operate the schedule presented in the AFC, whether through obtaining additional offsets in the future or due to the fact that the actual emissions will be lower than the estimated emissions used to determine offset requirements giving the applicant the ability to operate more than their current estimate of constraint.

A seasonal daylight clear hours plume size analysis has been performed for both of the potential turbine/HRSG configurations and the two noted operating schedules. The results of this plume frequency and size analysis is provided in **Table 3**.

Table 3 – Staff Predicted "Clear" Hours Cooling Tower Plume Dimensions

Turbine	Cooling Tower "Clear" Hours Plume Dimensions		
Alstom GTX100 – Original Operating Schedule (58.4% frequency)			
Percentile	Length	Height	Width
1%	2,673	2,951	498
5%	794	998	212
10%	374	530	144
15%	295	370	129
20%	**253**	**283**	**122**
25%	210	224	118
30%	157	183	110
35%	118	152	104
40%	95	127	97
45%	59	102	86
50%	39	81	76
55%	20	65	62
LM6000 PC Sprint – Original Operating Schedule (49.4% frequency)			
Percentile	Length	Height	Width
1%	1,961	2,560	402
5%	689	851	191
10%	328	430	133
15%	272	296	123
20%	**184**	**221**	**112**
25%	144	175	105
30%	108	142	98
35%	79	114	90
40%	46	92	79
45%	20	68	64
Alstom GTX100 – Reduced Operating Schedule (40.6% frequency)			
Percentile	Length	Height	Width
1%	1,774	2,218	367
5%	558	642	161
10%	282	351	123
15%	207	237	111
20%	**144**	**175**	**104**
25%	98	137	96
30%	62	105	85

35%	33	79	71
40%	8	55	49
LM6000 PC Sprint – Reduced Operating Schedule (36.1% frequency)			
Percentile	Length	Height	Width
1%	1,724	2,000	354
5%	512	590	148
10%	239	294	115
15%	151	190	102
20%	**108**	**145**	**95**
25%	79	109	88
30%	33	82	70
35%	7	56	49

Data provided in feet and height includes the 44 foot cooling tower cell height.

The significance analysis of the turbine/HRSG plumes will primarily consider the 20th percentile plume dimensions and will be included in the Visual Resources section of the Staff Assessment.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the Applicant's AFC (RE 2003a) and performed an independent psychrometric analysis and dispersion modeling analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for each HRSG stack.

HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the Applicant for each of the two potential Turbine/HRSG configurations, the frequency of visual plumes can be estimated. The operating data for these stacks are provided in **Table 4**.

Table 4 – HRSG Exhaust Parameters

Parameter	**HRSG Exhaust Parameters**				
Stack Height	120 feet (36.58 meters)				
Stack Diameter	11.0 feet (3.35 meters)				
Ambient Conditions	Molecular Weight	Mole (%)	Moisture Content (% by weight)	Exhaust Flow Rate (klb/hr)	Exhaust Temp (°F)
Alstom GTX100 Base Load					
34 °F	28.49	7.2	4.55	1,063.3	169
62 °F	28.42	7.8	4.94	1,029.8	174
99 °F	28.32	8.7	5.53	987.2	178
Alstom GTX100 Peaking					
34 °F	28.31	10.1	6.42	1,073.3	155
62 °F	28.24	10.8	6.88	1,039.8	156
99 °F	28.12	11.8	7.55	997.2	157
LM6000 PC Sprint Base Load					
34 °F	28.14	10.2	6.52	1,093.5	207
62 °F	28.05	11.0	7.06	1,043.6	204
99 °F	27.95	11.9	7.66	992.7	207
LM6000 PC Sprint Peaking					
34 °F	27.98	12.9	8.30	1,103.1	156
62 °F	27.88	13.8	8.91	1,053.2	156
99 °F	27.74	15.3	9.93	992.7	160

Source: AFC (RE 2003TID 2003a, Appendix 8.1-A and Appendix 8.1-H Table 8.1-H1)

Note(s): a. No inlet evaporative cooling at 32 °F.
b. Values were extrapolated or interpolated between hourly ambient condition data points as necessary.

The LM6000 turbines use water injection, approximately 24,000 pounds per hour each, which causes the significance difference in the exhaust water content between the two turbines.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a four-year meteorological data set from Sacramento. **Table 5** provides the CSVP model visible plume frequency results for duct firing and non-duct firing operations for the GTX Turbine and Sprint Turbine, respectively, using a four-year (1990-1993) meteorological data set, obtained from the National Climatic Data Center, from Sacramento Airport. These modeling results are then used to determine likely project plume frequency and size after consideration of the proposed project operating schedule.

Table 5 – Staff Predicted Hours with HRSG Steam Plumes
Sacramento 1990-1993 Meteorological Data

Case	Available (hr)	Alstom GTX100 Peaking		LM 6000 PC Sprint Peaking	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	34,980	16,058	45.9%	23,668	67.7%
Daylight Hours	17,865	4,514	25.3%	8,322	46.6%
Daylight No Rain No Fog	16,028	2,765	17.3%	6,502	40.6%
Seasonal Daylight Hours*	7,781	3,671	47.2%	5,806	74.6%
Seasonal Daylight No Rain No Fog*	6,123	2,049	33.5%	4,151	67.8%
Seasonal Daylight Clear**	3,475	963	27.7%	2,054	59.1%
Case	**Available (hr)**	**Alstom GTX100 Base**		**LM 6000 PC Sprint Base**	
		Plume (hr)	**Percent**	**Plume (hr)**	**Percent**
All Hours	34,980	4,130	11.8%	6,878	19.7%
Daylight Hours	17,865	914	5.1%	1,566	8.8%
Daylight No Rain No Fog	16,028	186	1.2%	450	2.8%
Seasonal Daylight Hours*	7,781	898	11.5%	1,502	19.3%
Seasonal Daylight No Rain No Fog*	6,123	173	2.8%	404	6.6%
Seasonal Daylight Clear**	3,475	115	3.3%	223	6.4%

*Seasonal conditions occur anytime from October through March.
**Available hours based on seasonal daylight clear hours.

For the proposed HRSGs operating with GTX turbines, the maximum temperature where a visible plume is predicted is 50°F when the relative humidity is 100%, when operating at base load conditions; and 64°F when the relative humidity is 93%, when operating at peaking load conditions.

For the proposed HRSGs operating with Sprint turbines, the maximum temperature where a visible plume is predicted is 57°F when the relative humidity is 100%, when operating at base load conditions; and 75°F when the relative humidity is 90%, when operating at peaking load conditions.

A plume frequency of 20% of seasonal (October through March) daylight clear hours is used as a plume impact study threshold trigger. The plume frequencies are predicted to be well less than 20% of seasonal daylight clear hours at base load conditions; however, both turbines show plume frequencies greater than 20% at peaking load conditions.

A seasonal daylight clear hours plume size analysis has been performed for both of the potential turbine/HRSG configurations and the two previously described duct firing operating schedules. The results of this plume frequency and size analysis is provided in **Table 6**.

Table 6 – Staff Predicted "Clear" Hours Turbine/HRSG Plume Dimensions

Turbine	Turbine/HRSG "Clear" Hours Plume Dimensions		
Alstom GTX100 – Original Operating Schedule (22.5% frequency)			
Percentile	Length	Height	Width
1%	1,228	1,061	233
5%	328	389	79
10%	213	232	55
15%	174	187	47
20%	**121**	**156**	**39**
LM6000 PC Sprint – Original Operating Schedule (49.7% frequency)			
Percentile	Length	Height	Width
1%	1,419	1,376	265
5%	469	548	110
10%	239	351	69
15%	249	267	62
20%	**220**	**229**	**56**
25%	177	206	51
30%	157	187	47
35%	131	173	44
40%	125	160	40
45%	98	147	35
Alstom GTX100 – Reduced Operating Schedule (8.8% frequency)			
Percentile	Length	Height	Width
1%	761	841	149
5%	207	208	50
LM6000 PC Sprint – Reduced Operating Schedule (26.1% frequency)			
Percentile	Length	Height	Width
1%	1,146	1,227	219
5%	358	383	77
10%	223	240	55
15%	177	195	47
20%	**128**	**165**	**40**
25%	85	140	33

Data provided in feet and height includes the 120 foot stack height.

The significance analysis of the turbine/HRSG plumes will primarily consider the 20th percentile plume dimensions and will be included Visual Resources section of the Staff Assessment. The Alstom GTX100 turbine is not predicted to have plumes greater than 20 percent of seasonal clear hours for the reduced operating schedule.

APPLICANT MODELING ANALYSIS AND PSA COMMENTS

The applicant has challenged staff's analysis and has provided their own cooling tower modeling analysis using the SACTI model. However, the applicant's analysis is critically flawed.

The primary flaw is that the cooling tower heat rejection load was input to the model as an annual average value. Cooling tower operation and plume formation are not linear, averaging input values will not show the extreme differences between operating with

duct firing and no duct firing. Further plume formation is a short-term event, more similar to modeling a 1-hour pollutant impact than an annual impact, so just as it would be inappropriate to use annual average emission to model 1-hour NO2 impacts it is inappropriate to use an annual average heat rejection rate to model cooling tower visible plumes. Even considering no other modeling issues this flaw renders the analysis invalid. However, other flaws in the applicant's modeling approach were found and are described as follows:

1. The meteorological data was not compensated to include calm wind speed hours as minimum wind speed hours. SACTI does not model calm hours, which underestimates plume sizes particularly plume height particularly for early morning hours which are often both calm and cool and moist (e.g. very plume favorable conditions).
2. The changes in cooling tower cell operation (i.e. reducing the number of operating cells) for cool weather when operating under base load were not incorporated into the modeling runs. This causes a significant underestimate of the plume potential during cool periods when operating under base load.

In summary, the applicant's modeling analysis does not properly reflect the cooling tower operating basis and is not considered a technically valid analysis.

One of the applicant's contentions regarding staff's cooling tower modeling analysis is that the CSVP model was providing overly conservative results. Staff would like to provide a comparison of a SACTI modeling run with a CSVP modeling to show that the CSVP analysis is not overly conservative. This comparison presented is for the GTX100 configuration operating with duct firing with a heat rejection rate of 182.5 MW (safety margined values). The all hours plume sizes, with calm hours not included for either model to provide a consistent comparison, for the October through March period (i.e. the period of concern) are provided in **Table 7** for the two models:

Table 7 – SACTI vs. CSVP Plume Frequency/Size Comparison

Percentile	Plume Length (ft)		Plume Height (ft)	
	CSVP	SACTI	CSVP	SACTI
1%	>16,400	>32,800	2,430	6,160
5%	>16,400	>32,800	1,404	4,585
10%	9,676	>32,800	915	3,231
20%	3,506	2,224	571	344
30%	2,148	1,302	522	285
40%	1,273	971	466	223
50%	754	751	390	184
60%	426	544	266	157
70%	223	298	177	148
80%	82	190	108	134
90%	No Plume	138	No Plume	118
100%	No Plume	>98	No Plume	>92

Note: Values sorted from percentile longest or highest and the SACTI data has been linearly interpolated as necessary.

This shows that CSVP predicts lower plume frequencies than the SACTI model (i.e. predicts hours with no plume) and reduced plume sizes at the upper and lower end of the frequency scale. However, CSVP does predict larger, particularly taller, plumes in

the middle of the frequency scale. However, it is hard to rationalize the differences as the SACTI model provides disjointed results with single variable cooling tower exhaust inputs and a significantly reduced number of modeled meteorological conditions. The results are disjointed because of the very few meteorological conditions actually modeled, so that one meteorological condition can represent more than twenty percent of the modeling results and the plume sizes estimated make large jumps that correspond to this limiting assumption. With staff's hourly approach each distinct hourly plume size estimate only represents a very small fraction of a percent and creates a smooth transition from the estimated small to large plumes.

Staff believes that CSVP estimates somewhat larger plumes through a portion of the frequency scale due to three separate issues: 1) CSVP does not incorporate stack downwash (which will be discussed in detail below); 2) Staff adjusts the exhaust conditions to the ambient condition more accurately than SACTI resulting in a warmer wetter exhaust under certain ambient conditions and a cooler dryer exhaust under other ambient conditions, which allows CSVP to better estimate hours with no plume and the plume rise conditions that would occur during hours with plumes; and 3) the aforementioned meteorological data grouping will provide for disjointed results. Staff would like to note that in other licensing cases the SACTI modeling results have shown more and larger plumes than CSVP throughout the plume frequency scale, it just so happens based on the cooling tower design assumptions and the local meteorological characteristics that it does not do so in this case.

Because staff sorts the plume size results based on plume height the potential for downwash to affect the CSVP results are greatly reduced. For example, for the GTX100 cooling tower case using the original operating assumptions as provided in the AFC the clear hour plumes occurred with an average wind speed of 3.3 m/s (essentially the same as the average wind speed in the meteorological data set), while the top 20 percentile occurred with an average wind speed of only 1.48 m/s (3.3 mph). The SCREEN3 model predicts that downwash will not occur for the Roseville cooling tower structure until wind speeds exceed 4.7 m/s (10.5 mph). Very few hours in the top 20 percentile clear hour plumes occur with wind speed this high, as an example for the GTX100 original schedule modeling case only 0.9% of the hours have wind speeds this high or higher. Therefore, staff's method of interpretation of the modeling results solves this potential problem, and generally only includes hours where the plume should not be affected by downwash.

Also, staff is able to select the specific ambient conditions (clear conditions) it considers for significance while maintaining the integrity of the modeling results for each selected hour. SACTI groups met data and therefore can create bias, both positively and negatively, and that bias can change depending on what specific parts of a meteorological data file are provided to the model. Using the CSVP model staff is also able to adjust the exhaust conditions based on the actual operating assumption (including the number of cells in operation) and ambient condition for each hour modeled. SACTI does not make such coordinated hourly adjustments and therefore may underestimate plume rise during hourly conditions with low temperature and or high relative humidity which causes differential in the cooling tower exhaust temperature and ambient temperature to increase and so increase the thermal buoyancy of the plume.

One clear observable difference in the modeling results between the CSVP and SACTI models is the ability of the CSVP model to better predict the fairly common vertical plumes that dissipate prior to any significant horizontal movement due to the wind. The SACTI results, while forecasting plumes 100% of the time, do not forecast any plume lengths below 30 meters. CSVP on the other hand forecasts hundreds of hours with plume heights greater than plume lengths with a plume length of less than 30 meters.

Finally, it should be noted that staff has used the applicant's assumed operating assumptions even though some of these assumptions may not be conservative; and that staff's significance analysis discards: 1) all nighttime plumes, 2) all plumes during hours with any noted wet weather condition (including fog); 3) all hours with visibility of less than 5 miles; and 4) non-clear (i.e. cloudy and overcast) hours. Therefore, staff has essentially thrown out the major subset of the ambient conditions most conducive to the formation of visible plumes before the assessment of significant even begins. Therefore, staff believes that the selected modeling analysis methods and significance basis provides a reasonable basis for the determination of visual impacts due to cooling tower and turbine/HRSG visible plumes.

CONCLUSIONS

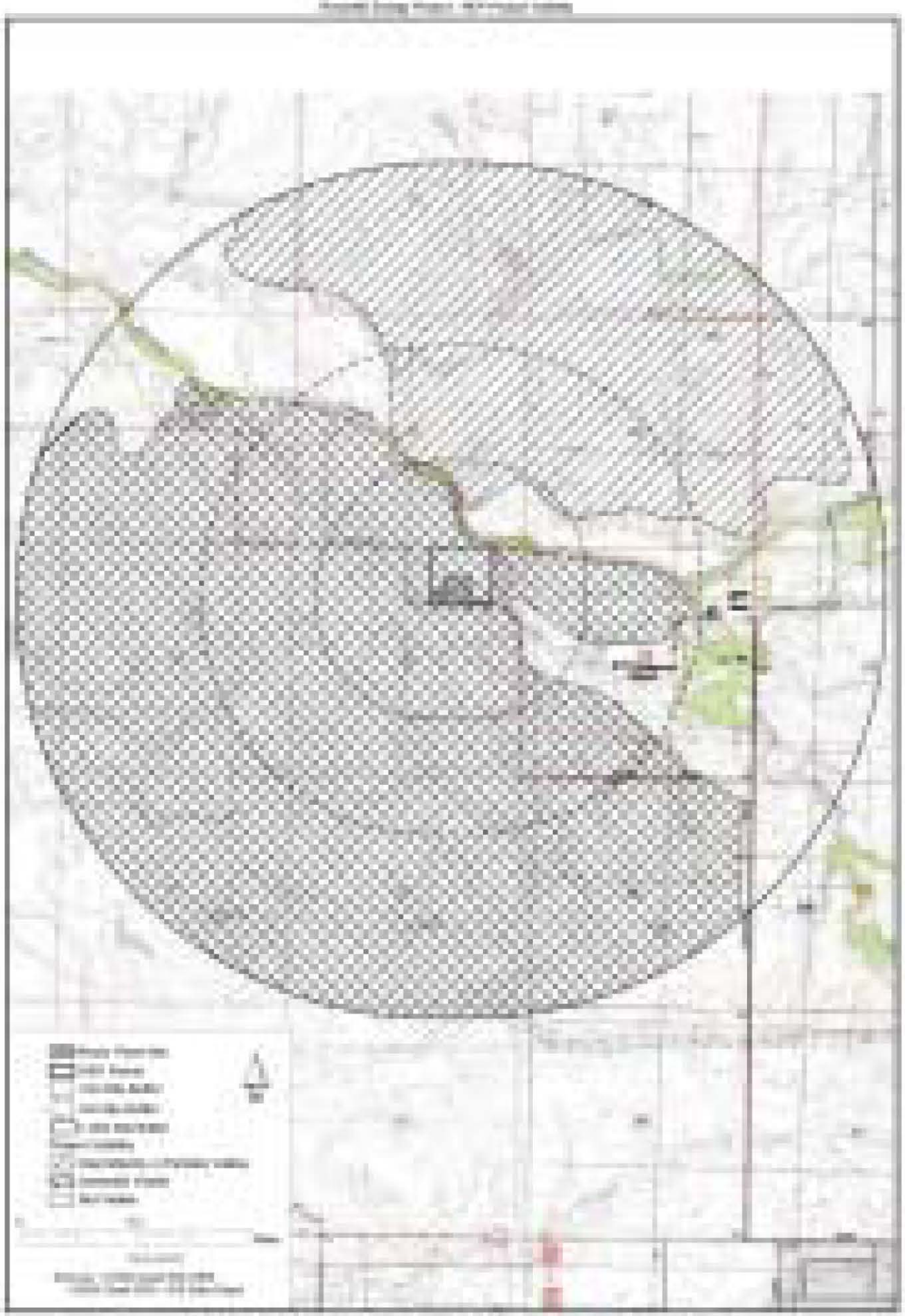
Visible plumes from the proposed REP cooling tower and turbine/HRSGs exhausts are expected to occur greater than 20% of seasonal daylight clear hours, with the exception of the GTX turbine/HRSG plumes under the reduced operating hours scenario. Therefore, an analysis of the project's cooling tower and turbine/HRSG plumes is included in the Visual Resources section.

REFERENCES

Roseville Electric, Roseville, California (RE) 2003a. Application for Certification, Volumes I & II. Submitted to the California Energy Commission on October 30, 2003.

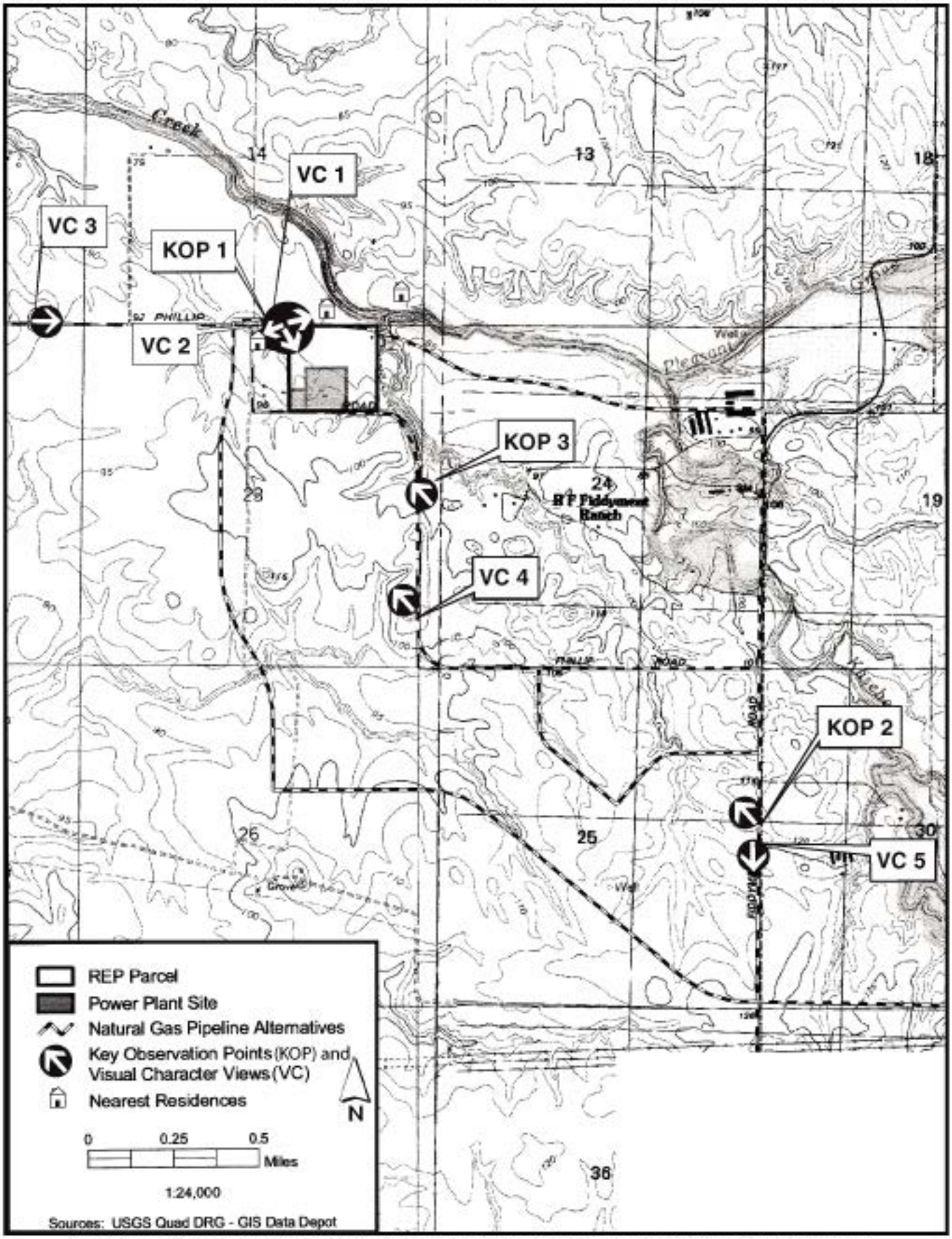
Roseville Electric, Roseville, California (RE) 2004a. Response to Data Requests. Submitted to the California Energy Commission on February 6, 2004.

Roseville Electric, Roseville, California (RE) 2004b. 2003 Annual Report. 2004



VISUAL RESOURCES - FIGURE 2

Roseville Energy Park - Location and View Direction of Key Observation Points and Visual Character Photographs



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: AFC Figure 8.13-2

VISUAL RESOURCES - FIGURE 3
Roseville Energy Center - Visual Character Photographs

VC 1
Residence located north of the project site, looking northeast from northwest corner of REP parcel.
Source: AFC Figure 8.13-4

VC 2
View to west looking at Residence and Dog Kennel on Phillip Road from northwest corner of REP parcel.
Source: CEC Staff Photograph

VC 4
The PGWWTP, looking northwest frcm Phillip Road.
Source: AFC Figure 8.13-3

VC 3
View east towards project site along Phillip Road (kennel at left, REP site at left of center, PGWWTP at the right).
Source: AFC Figure 8.13-5

VC 5
View south along Fiddyment Road, Del Webb Sun City landscape buffer at left.
Source: AFC Figure 8.13-6

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: AFC and CEC Staff Photo as noted

VISUAL RESOURCES - FIGURE 4A

Roseville Energy Park - KOP 1 - Existing View of the REP Site, Looking Southeast from the Northwest Corner of the REP Parcel

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: AFC Figure 8.13-7a

VISUAL RESOURCES - FIGURE 4B
Roseville Energy Park - KOP 1 - Simulated View of the REP Project

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: AFC Figure 8.13-7b

VISUAL RESOURCES - FIGURE 5A

Roseville Energy Park - KOP 2 - Existing View Looking Northwest Toward REP Site from Fiddyment Road, South of Del Webb Boulevard

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: AFC Figure 8.13-8a

VISUAL RESOURCES - FIGURE 5B

Roseville Energy Park - KOP 2 - Simulated View of the REP Project

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004

SOURCE: AFC Figure 8.13-8b

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WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

INTRODUCTION

This Waste Management analysis examines the issues associated with managing wastes generated from constructing and operating the proposed Roseville Energy Park (REP). Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

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

- The management of the wastes will 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 will be managed in an environmentally safe manner; and
- The disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

Resource Conservation and Recovery Act (42 U.S.C. § 6922)

Resource Conservation and Recovery Act (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 (U. S. EPA) or authorized state agency.

Title 40, Code of Federal Regulations, part 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are

described in terms of ignitability, corrosivity, reactivity, and toxicity; and specific types of wastes are listed.

STATE

California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended)

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)

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

Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)

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

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 the generator's waste management plans and performance over the reporting period.

LOCAL

The Placer County Department of Health and Human Services has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed REP.

The REP must also comply with the Roseville Fire Department, which will govern the storage and use of hazardous materials and wastes per Fire Code requirements. The

Roseville Hazardous Materials Emergency Response Unit is responsible for emergency spills, containment and cleanup (Roseville 2003a pp. 8.14-14 – 8.14-15).

SETTING

PROJECT AND SITE DESCRIPTION

The proposed REP would be located on 12 acres of a 40–acre parcel of land in the City of Roseville in Placer County. The site is located adjacent to and north of Roseville's Pleasant Grove Waste Water Treatment Plant (PGWWTP). The major components of the proposed REP project are a 160-megawatt (MW) combined-cycle generating facility configured using two natural-gas-fired combustion turbines, one steam turbine, two heat recovery steam generators, a cooling tower, and selective catalytic reduction. REP proposes to construct a six-mile, 10 to 16-inch natural gas pipeline. The PGWWTP would supply the proposed project with recycled water to be used for cooling tower make-up (Roseville 2003a, Section 2.0).

The REP parcel is not developed and is sparsely vegetated. The site was once used for rural residential purposes and grazing. A construction staging and laydown area for the PGWWTP is now located on the proposed site. The proposed pipeline route would be developed along Fiddyment Road between Baseline Road and Phillip Road. The pipeline route is mostly residential on the east side of Fiddyment and entirely agricultural on the west side. Residential uses include a small amount of high-density and medium-density residential, as well as low-density residential, including Del Webb Sun City Roseville north of Pleasant Grove Boulevard. Agricultural uses include grazing and some crop growing for hay (Roseville 2003a p. 8.6-8).

There were three Phase I and one Phase II Environmental Site Assessments (ESA) performed according to the American Society for Testing and Materials (ASTM) Standard E 1527 for the area surrounding and including the proposed project site included in this AFC. The ESAs were performed for the PGWWTP and the proposed project site. The ESAs were completed by Earthtec ltd on January 7, 1999, Anderson Consulting Group on April 6, 1999, URS in August 2001, and Tetra Tech in September 2003 (Roseville 2003a Appendix 8.14).

The four combined ESAs reviewed parcels assigned Assessor‘s Parcel Numbers (APN): 17-100-15, -17, -18, -20, -27, -28, -29, -30, -31, -34, and -35. The REP project site includes portions of (APN): 17-100-17, -18, -29, -30, and -31. The purpose of the investigations was to identify recognized environmental conditions at the project sites (CH2MHill 2004e). The applicant completed a Roseville Energy Park Corridor Study Report (CSR) in February 2004. Staff conducted an additional site reconnaissance along all accessible portions of the proposed natural gas pipeline route on March 29, 2004. The ESAs did not indicate any significant contamination (Roseville 2003a Appendix 8.14). Staff investigated the pipeline route to verify that no new businesses, such as dry cleaners, car dealerships, etc. were established during or after the Phase I ESAs that might change the ESA conclusions. Staff found no new businesses or any unexpected structures along the route during the reconnaissance.

PROJECT SPECIFIC IMPACTS

Construction

Site preparation and construction of the proposed plant and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms.

Nonhazardous Solid Wastes

Nonhazardous solid wastes anticipated to be generated during construction are detailed in Section 8.14.2.1 of the AFC (REP 2003a). Approximately 50 tons of wood, paper, glass and plastics, 30 tons of excess concrete and 10 tons of scrap metal could be generated during project construction. Wherever possible and practical, these wastes would be recycled, particularly the paper products and metals. Nonrecyclable wastes would be collected and disposed of in a Class III landfill. A possible exception might include the disposal of the waste concrete in a clean fill site if one is available.

Drilling will be necessary to install the natural gas and water pipelines. Two hundred tons of drilling mud, which consists of nontoxic bentonite clay, will be used to lubricate and cool the drilling bit. The drilling mud will be tested before disposal at a Class II or III landfill (Roseville 2003a Section 8.14.2.1).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during construction. These liquid wastes include sanitary wastes, equipment washwater, stormwater runoff, and wastewater from the gas pipeline hydrotesting process (Roseville 2003a p. 8.14-3). If excavation dewatering occurs, additional nonhazardous wastewater would be generated.

Sanitary waste would be collected in portable toilet facilities. Equipment washwater would be contained at the designated wash sites and disposed of offsite. Stormwater runoff will be managed according to an approved plan developed by the construction contractor and is discussed in more detail in the **Soil and Water Resources** section of this document. Wastewater resulting from the hydrostatic test of the gas pipeline would be filtered to remove sediment and welding fragments, and then tested for contaminating components. The construction contractor would discharge non-contaminated hydrotesting water to an existing storm sewer along the pipeline corridor per applicable regulations.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction are discussed in Section 8.14.2.1 of the AFC. Solid hazardous wastes may include spent welding materials and dried paint. Liquid hazardous wastes would include waste solvents along with flushing, cleaning and passivating (nitrate or phosphate solution) fluids. Minimal quantities of the solid wastes and solvents are anticipated. The liquid flushing, cleaning

and passivating wastes would be generated in quantities estimated at one to two times the internal volumes of the pipes being cleaned (Roseville 2003a Section 8.14.2.1).

The construction contractor would be considered the generator of hazardous wastes at this site during the construction period and would be responsible for proper waste handling, storage, disposal, record keeping, and employee training. Solid hazardous wastes along with liquid wastes (except for the flushing wastes referred to above which will be temporarily stored on-site in portable tanks and disposed off-site) would be accumulated at satellite locations and then transported daily to the 90-day storage area located at the site construction laydown area. The wastes thus accumulated would be removed from the site and transported by a certified collection company to a permitted transfer, storage and disposal (TSD) facility prior to the expiration of the 90-day limit (Roseville 2003a Section 8.14.2.1).

Operation

The proposed REP would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions.

Nonhazardous Solid Wastes

Nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, machine parts, electrical materials, empty containers, and typical worker and small office wastes. Approximately 30 cubic yards of these wastes would be generated annually. Large metal parts would be recycled (REP 2003a, p. 8.13-6).

Zero Liquid Discharge System

In order to reduce and reuse wastewater in the plant, REP proposes to implement a zero-liquid discharge (ZLD) system for the proposed project (Roseville 2003a Section 8.14.2.2).

The ZLD system would include a brine concentrator system, crystallizer system, and associated equipment such as tanks and pumps. The ZLD system would be designed to process all of the wastewater produced by the plant's primary wastewater system, returning a relatively high quality distillate stream for reuse in the plant and producing a solid waste stream (salt cake). Wastewater would be processed in two steps. The first would be a brine concentrator, which would concentrate the wastewater to produce a clean distillate stream. The second step would further process the remaining wastewater, producing another clean distillate stream and the salt cake.

The operation of the ZLD system would result in a generation of approximately 867 tons per year of salt cake (Roseville 2003a, p. 8.13-6), which would require disposal (Roseville 2003a, p. 8.14-4). Testing was done for similar ZLD systems in support of the Three Mountain Project and Pastoria Energy Facility siting cases in order to determine if the wastes might be classified as hazardous. Analyses of the solid wastes similar to those that would be generated from the softener, as well as the crystallizer, indicated that all metals of concern were below California regulatory limits that define hazardous waste (Ogden 2000a and PEF/Thompson 2000f). In order to ensure the correct classification of such wastes from the proposed project, however, staff proposes Condition of Certification **WASTE-7**, which would require testing of the salt cake.

Although the solid waste generated from the crystallizer may not be classified as hazardous, it might be considered a California designated waste due to its high salt content. The category of designated waste includes nonhazardous waste that contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations that could exceed applicable water quality objectives or affect the beneficial uses of waters of the state (Cal. Code Regs., tit. 27, § 20210). Designated wastes are required to be disposed of at Class I or Class II disposal sites. However, a designated waste can be discharged to a Class III disposal site if it can be demonstrated that there is a lower risk to water quality than indicated by the "designated waste" classification.

The effluent from the brine concentrator would be piped to the crystallizer for further concentration as typically done in ZLD systems (Roseville 2003a Section 7.4.1.1). Secondary materials (such as the effluent), that are reclaimed and returned in a closed system to the original process in which they were generated where they are reused (in this case, as plant process water), are exempt from management as hazardous wastes (Cal. Code Regs., tit. 22, § 66261.4(a)(5)(A)). Thus, because the effluent would be recycled in a closed system, it would not require hazardous waste testing nor would a permit be required from DTSC. Construction and operation of the zero liquid discharge system would not have any significant effects on any of the other waste streams generated at REP.

Hazardous Wastes

Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, used oil filters, laboratory waste, selective catalytic reduction (SCR) and oxidation catalysts, oily rags and absorbents, and used acidic and alkaline chemical cleaning wastes (potentially containing high concentrations of heavy metals). Table 8.14.1 in the AFC ((Roseville 2003a p. 8.14-6) lists the anticipated hazardous wastes (except the cleaning solutions) along with their origin, composition, estimated quantity, hazard class, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. For example, all the lubricating oil, totaling approximately 2,500 gallons per year, would be recycled. The emission control catalyst would require replacement every three to five years, resulting in the generation of a total of 25,000 pounds of waste material that could require disposal in a Class I facility if recycling or regeneration proves not to be feasible. Chemical materials collected in drains as a result of spillage, overflows, and maintenance operations will be neutralized onsite (if necessary) and directed into the cooling tower basin. Four hundred gallons per year of sulfuric acid will be used in water treatment. In addition, Table 8.14-1 of the AFC ((Roseville 2003a p. 8.14-6) notes that up to 80 pounds per year of cooling tower sludge will normally require disposal in a Class II facility, but could sometimes require disposal as a hazardous waste.

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Nonhazadous waste disposal sites suitable for discarding project-related construction and operation wastes are identified in Section 8.14.3 of the AFC (REP 2003a). During construction of the proposed project, 290 tons of nonhazardous will be generated. This would consist of 50 tons of paper, wood, and plastic; 30 tons of concrete; 10 tons of

metal; and 200 tons of drilling mud. The nonhazardous solid wastes generated yearly at the REP would be recycled if possible, or disposed of in a Class III landfill. Thirty cubic yards per year of miscellaneous wastes, rags, machine parts, etc., are projected to be generated throughout operation of the plant. During operation, another 867 tons per year of salt cake would also be generated and require disposal at a Class I or II landfill, depending upon the results of toxicity testing.

Section 8.14.1 (Roseville 2003a p. 8.14-7) notes that City of Roseville's Solid Waste Division provides collection services for removal of solid waste from the proposed project site. The nonhazardous solid waste will be deposited in either the Western Placer Waste Management Authority Materials Recovery Facility for recycling or the Western Regional Sanitary Landfill (Roseville 2003a p. 8.14-7). The total amount of nonhazardous waste generated from project construction and operation will contribute less than one percent of available landfill capacity. Staff finds that disposal of the solid wastes generated by the REP can occur without significantly impacting the capacity or remaining life of any of these facilities.

Section 8.14.3.2 of the AFC lists three Class I landfills. The three Class I landfills in California are: the Clean Harbors Buttonwillow Landfill in Kern County, the Clean Harbors Westmorland Landfill in Imperial County, and the Waste Management Landfill in King's County. There are 37 offsite hazardous waste treatment and recycling facilities in California capable of handling various portions of the facility's hazardous waste. Together, the two Safety-Kleen facilities and the Kettleman Hills facility possess an excess of 11.8 million cubic yards of remaining hazardous waste disposal capacity, with remaining operating lifetimes up to the year 2040. It is estimated that 867 tons per year of salty cake will be generated during operation of the ZLD. Thus, even if the salt cake were to be placed in a Class I facility, no significant impact on waste disposal facilities would occur.

MITIGATION

In section 8.14.4 of the AFC (Roseville 2003a p. 8.14-9), the applicant states that the handling and management of wastes at the proposed REP facility would follow the hierarchical approach described in the following order of preference from greatest to least:

1. source reduction through pollution prevention measures;
2. recycling or reusing waste materials;
3. treatment to render the waste nonhazardous such as through neutralization; and
4. disposal of only those wastes that cannot be reduced treated or recycled.

Sections 8.14.4.1 and 8.14.4.2 of the AFC (Roseville 2003a) discuss waste management measures REP would employ during the construction and operation phases to manage and mitigate the impacts of the generation of liquid and solid non-hazardous and hazardous wastes.

Staff has proposed Conditions of Certification **WASTE-1** through **-7** which require that: 1) the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; 2) if potentially contaminated soil is unearthed during excavation at 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 the Compliance Project Manager (CPM) and the appropriate regulatory agencies; 3) the project owner obtain a unique hazardous waste generator identification number from the Department of Toxic Substances Control (DTSC) in accordance with DTSC regulatory authority; 4) the project owner notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action; 5) the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM and the local agency; 6) the project owner provide hazardous waste recognition training to workers; and 7) the project owner test the salt cake product from the crystallizer for the presence of hazardous levels of metals.

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

The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the California Department of Toxic Substances Control (DTSC). Because hazardous wastes would be produced during project construction and operation, both the REP and its construction contractor would be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both REP and its construction contractor would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records and appropriately train their employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction and Evaluation Review and Plan may be required to be prepared by the REP.

CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of the REP project would add to the total quantities of waste generated in Placer County and the State of California. However, because (a) the waste would be generated in small quantities, (b) recycling efforts would be prioritized wherever practical, and (c) capacity is available in a variety of disposal facilities, these added quantities would not result in significant waste management impacts to any hazardous or nonhazardous landfill.

This facility would generate an estimated 290 tons of solid waste during construction and 30 cubic yards (equivalent to 30 tons or less) per year during operation. For comparative purposes, the Integrated Waste Management Board Jurisdiction Disposal and Alternative Daily Coverage (ADC) WebPages list the amount of solid waste disposed of in Placer County as 263,784 tons in 2002 (IWMB 2004). REP's contribution will represent less than one percent of total county waste generation. The amount of

solid waste anticipated to be generated by the proposed facility constitutes an insignificant increase to this total.

FACILITY CLOSURE

Section 8.14.4.3 of the AFC (Roseville 2003a) discusses REP's responsibilities for waste management in the event of a temporary facility closure due to a disruption in the supply of natural-gas fuel or damage to the facility due to a natural disaster or permanent closure due to a cessation of operations. The applicant indicates that a contingency plan for temporary closure will be prepared prior to facility startup. In addition, a Risk Management Plan (AFC Section 8.12.8.4) will be established containing additional procedures to be followed in the event of temporary closure due to plant damage or the possible release of a hazardous waste or material into the environment.

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

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

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

For planned permanent closure, REP would develop a facility General Closure Plan at least twelve months prior to commencement of closure and is committed to complying with LORS that are applicable at the time of closure. The applicant indicates (see AFC Section 8.14.4.3) that such a closure plan would emphasize the maximum recycling of facility components and 24-hour site security.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

The Department of Toxic Substances Control reviewed the AFC and submitted comments and participated in the development of Data Requests 70 and 71 (Gillette 2004a). The data requests called for a Phase I ESA for the pipeline to be provided by the applicant (CH2MHill 2004a). The applicant provided an Environmental Data

Resources, Inc. Corridor Study Report and Energy Commission staff completed an additional site survey (CH2MHill 2004a). Another data request requested historical background of the agricultural areas. The applicant provided aerial photographs of the proposed project site.

The DTSC representative is satisfied that the applicant provided adequate information on both data requests and that there are not outstanding issues with the project (Gillette 2004b).

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the applicant's waste management plan for the proposed REP would allow for compliance with LORS designed to minimize the potential for human health and environmental effects and will not cause a significant direct, or indirect, cumulative adverse impact.

To ensure implementation of all necessary mitigation measures, staff recommends adoption of the conditions of certification listed below.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the CPM for review and approval. The resume shall show 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 have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit the resume to the CPM.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, 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 CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the Regional Water Quality Control Board (as appropriate), the Roseville Fire Department, and the Sacramento Office of the

California Department of Toxic Substances Control 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.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the Monthly Compliance Report of its receipt.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste stream, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM.

The operation waste management plan shall be submitted to the CPM no less than 30 days prior to the start of project operation. 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 compared to the planned management methods.

WASTE-6 Prior to any earth moving activities, employees shall receive hazardous waste-related training that focuses on the recognition of potentially contaminated soil and/or groundwater and contingency procedures to be followed as specified in **WASTE-2** above. Training shall comply with Hazardous Waste Operations (8 CCR 5192) and Hazard Communication (8 CCR 5194) requirements as appropriate.

Verification: The project owner shall notify the CPM via the monthly compliance report of completion of the hazardous waste training program.

WASTE-7 The project owner shall test the salt cake product from the crystallizer for the presence of hazardous levels of metals. If levels are below ten times the Soluble Threshold Level Concentration as listed in Title 22, California Code of Regulations, section 66261.24, then future testing is not required unless there is a substantial change in the wastewater treatment process. If not classified as a hazardous waste, the project owner shall manage the salt cake product appropriately as a nonhazardous or designated waste unless it is sold as a commercial product.

Verification: No later than 30 days after the initial generation of salt cake, the project owner shall notify the CPM of the test results and the planned disposal method.

REFERENCES

California Energy Commission, Sacramento, California (CEC) 2003a. Commission Determination that the Application for Certification is Complete. Submitted to Docket on December 17, 2003.

CH2MHill, Sacramento, California (CH2MHILL) 2004a. Applicant's Responses to CEC Staff Data Requests 1-71. Submitted to the Docket on February 6. 2004.

CH2MHill, Sacramento, California (CH2MHill) 2004e. Applicant's Responses to CEC Data Requests 70-71. Submitted to Docket on March 1 2004.

Gillette 2004a. Email March 17, 2004 from Maria Gillette, Department Toxic Substances Control to Ellen Townsend-Hough, California Energy Commission.

Gillette 2004b. Phone conversation March 30, 2004 from Maria Gillette, Department Toxic Substances Control to Ellen Townsend-Hough, California Energy Commission.

IWMB 2004. Integrated Waste Management Board. Jurisdiction disposal and Alternative Daily Coverage. http://www.ciwmb.ca.gov/LGCentral/DRS/Reports

Ogden 2000a. Detailed Mitigation Plan and Analysis of Impact Assessments in Resource Areas Affected by the Mitigation Plan. Three Mountain Power, LLC. AFC-99-02. Submitted to the California Energy Commission. August 21.

PEF (Pastoria Energy Facility/Thompson) 2000f. Applicant's Data Request Responses (Third Data Response Submittal). Submitted to the California Energy Commission on April 3, 2000.

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh, P.E. and Rick Tyler

INTRODUCTION

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

The purpose of the Worker Safety and Fire Protection analysis is to assess the worker safety and fire protection measures proposed by the Roseville Energy Park (REP) 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, REGULATIONS AND STANDARDS

FEDERAL

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

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

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

Applicable federal requirements include:

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

STATE

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

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

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

Finally, Title 8, California Code of Regulations, section 3203 requires that employers establish and maintain a written Injury and Illness Prevent Program to identify workplace

hazards and communicate them to its employees through a formal employee-training program.

Applicable State requirements include:

- Title 8, California Code of Regulations, section 330 et seq. Cal/OSHA regulations;
- Title 24, California Code of Regulations, 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 the facility;
- Health and Safety Code, sections 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

LOCAL

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

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

Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United States' 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. The City of Roseville Fire Department is the administering agency for the 2000 Uniform Fire Code (Hendrickson 2002).

Applicable local (or locally enforced) requirements include:

- 2001 Edition of California Fire Code and all applicable NFPA standards (Cal. Code Regs., tit. 24, Part 9);
- California Building Code Title 24, California Code of Regulations (Cal. Code Regs., tit. 24, § 3 et seq.).
- Uniform Fire Code, 2000

SETTING

The proposed REP site is located approximately 5 miles northwest of downtown Roseville, and about 18 miles northeast of the City of Sacramento. The terrain elevation is approximately 95 feet above mean sea level. The overall terrain in the vicinity slopes downward in a westward direction toward the Sacramento Valley. At present, the area surrounding the site is generally undeveloped with some agricultural uses. See Project Description in this Preliminary Staff Assessment for more details.

The REP project involves construction and operation of a natural gas fired combined cycle facility with ancillary facilities including pipelines.

Fire support services to the site would be under the jurisdiction of the City of Roseville Fire Department. The closest fire station is Fire Station #5, located at 1567 Pleasant Grove Boulevard in Roseville, which is approximately 3.8 miles away (Roseville 2003a). The response time to the project site is estimated to be 8 to 10 minutes. Backup fire support, if needed, would come from Fire Station #2, located at 1398 Junction Boulevard in Roseville, with a similar response time. (Roseville 2003a Section 8.16.2.2, Ippolito).

The City of Roseville Hazardous Materials Team is assigned as the off-site hazardous materials first responder for the REP. Hazmat response would come from the fire station located at 401 Oak Street, Roseville, approximately 7 miles away. Their response time is estimated to be 15 minutes (Anderson).

IMPACTS

WORKER SAFETY

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

FIRE HAZARDS

During construction and operation of the proposed Roseville Energy Park, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS would be adequate to assure protection from all fire hazards. The City of Roseville Fire Department has stated that it is adequately equipped and

staffed to respond to an on-site fire within 10 minutes or less (Ippolito), and the City of Roseville Fire Department has stated that they are prepared to deal with any conceivable hazardous materials spill (Anderson).

APPLICANT'S PROPOSED MITIGATION

WORKER SAFETY

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The Roseville Energy Park encompasses construction and operation of a natural gas fired facility with ancillary facilities such as transmission lines and pipelines. Workers would be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published at Title 8, California Code of Regulations, section 1502 et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phases of the project. The Construction Safety and Health Program would include the following:

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

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

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;

- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Confined Space Entry Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of the Roseville Energy Park, detailed programs and plans would be provided pursuant to the condition of certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Upon completion of construction and prior to operations at the Roseville Energy Park, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (Cal. Code Regs., tit. 8, § 3203);
- Emergency Action Plan (Cal. Code Regs., tit. 8, § 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal. Code Regs., tit. 8, § 3221); and
- Personal Protective Equipment Program (Cal. Code Regs., tit. 8, §§ 3401-3411).

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

The AFC includes an adequate outline of the Emergency Action Plan (Roseville 2003a, Pages 8.7-12 and 8.7-16). Prior to operation of the Roseville Energy Park project, all detailed programs and plans would be provided pursuant to condition of certification **WORKER SAFETY-2**.

Safety and Health Program Elements

The applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program (Roseville 2003a, Section 8.7.4.3). The measures in these plans are derived from applicable sections of state and federal law. The major items required in both construction and operation Safety and Health programs are as follows:

Injury and Illness Prevention Program (IIPP)

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

The IIPP would include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Methods of documenting inspections and training and for maintaining records; and
- A training program for introducing the program; for new, transferred, or promoted employees; for new processes and equipment; for supervisors; for contractors.

Emergency Action Plan

California regulations require an Emergency Action Plan (Cal. Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (Roseville 2003a, Pages 8.7-12 and 8.7-16).

The outline lists the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities during Emergencies;
- Specific Response Procedures;
- Evacuation Plan;
- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;
- Accident Reporting and Investigation;
- Lockout/Tagout;
- Hazard Communication;

- Spill Containment and Reporting;
- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;
- Sanitation; and
- Work Site Inspections.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (Cal. Code Regs., tit. 8, § 3221). The AFC describes a proposed fire prevention plan which is acceptable to Staff (Roseville 2003a, Page 8.16 -11). The plan would include the following topics:

- Responsibilities;
- Procedures for fire control;
- Fixed and Portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

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

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (Cal. Code Regs., tit. 8, §§ 3380-3400). The Roseville Energy Park project operational environment would require a PPE program.

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

Each employee would be provided with the following information pertaining to the protective clothing and equipment:

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

A PPE program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program.

Operations and Maintenance Written Safety Program

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

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

FIRE PROTECTION

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (Roseville 2003a, Section 8.16) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. The project would rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services including trained firefighters and equipment for a sustained response would be required from the City of Roseville Fire Department.

During construction, an interim fire protection system would be in place. The permanent facility fire protection system would be placed in service as early as possible during the construction phase.

The information in the AFC indicates that the project intends to meet the minimum fire protection and suppression requirements. Staff agrees that the project would indeed meet all requirements including adequate RFD response times. Elements include both fixed and portable fire extinguishing systems.

Water for firefighting would be stored in an on-site tank that will contain recycled water supplied by the neighboring waste water treatment plant.

Fixed fire suppression systems will be installed at determined fire risk areas. A carbon dioxide (CO_2) fire protection system would be provided for the combustion turbine generator (CTG) enclosure and accessory equipment (Roseville 2003a, Section 8.16.2). This system would have automatic fire detection sensors. Deluge type spray systems which provide fire protection for the steam turbine lube oil skid and combustion turbine lube oil skids.

Fire hydrants and hose stations would supplement the plant fire protection system using water from the plant underground firewater system loop. Fire hydrants with hose houses would be placed in accordance with NFPA 10 and local fire codes. Electric motor-driven fire pumps will provide water under pressure for the plant fire water loop. A diesel engine-driven fire pump will provide backup to the motor-driven pumps in the event of a power failure. Sprinkler systems will also be installed in the administration building and the fire pump enclosure, as required by NFPA and local code requirements.

The applicant will be required to provide the final Fire Protection and Prevention Program to Staff and to the City of Roseville Fire Department, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. A facility closure plan will be developed prior to closure to incorporate these requirements.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of the Roseville Energy Park project, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the City of Roseville Fire Department and found that cumulative impacts were insignificant. There are few industrial facilities in this agricultural area, Assistant Fire Marshal Tim Ippolito confirmed that the City of Roseville Fire Department is adequately staffed and equipped to control whatever fire could occur at an industrial facility of this type, and the department's response time will be adequate (Ippolito). Staff also finds that the fire-fighting response time is no greater than for other California rural power plants previously certified by the CEC.

RESPONSE TO AGENCY COMMENTS

City of Roseville (August 16, 2004): Staff has determined that the Items related to fire protection and worker safety contained in City of Roseville's Major Project Permit Conditions of Approval for the Roseville Energy Park (CRCD 2004a) are fully addressed by the applicant's compliance with LORS applying to REP. The City of Roseville Assistant Fire Marshall, Tim Ippolito, confirmed that this is the case (Ippolito 2004b). The items are : 21-37, 47-60. Therefore, no additional specific Conditions of Certification are required.

CONCLUSION AND RECOMMENDATIONS

If the applicant provides a Project Construction Safety and Health Program and a Project Operations Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1** and **-2**, Staff believes that the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. The Safety and Health Programs apply to all project-related construction and operations, including the new gas pipeline and compressor stations. Staff also concludes that the proposed project, including the new natural gas line and compressor stations, would not have significant impacts on local fire protection services.

If the Energy Commission certifies the project, Staff recommends the adoption of the following proposed Conditions of Certification. The proposed Conditions of Certification provide assurance that the Construction Safety and Health Program and the Operations Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS. Condition of Certification **WORKER SAFETY-3** assures that the worker safety and health plans are properly implemented and monitored during the construction and commissioning phases of the project.

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 a:

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

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety

Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the City of Roseville Fire Department for review and comment prior to submittal to the CPM.

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 letter from the City of Roseville Fire Department stating that they have reviewed and commented on the Construction Fire Protection and 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:

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

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted to the City of Roseville Fire Department for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety & Health Program.

WORKER SAFETY-3 The project owner shall ensure that a CPM approved Safety Monitor(s) conducts an on-site safety inspection at least once a week during construction of permanent structures, and commissioning, of the power plant unless a lesser number of inspections are approved by the CPM. The CPM may also require a similar inspection and report concerning linear facilities.

The Safety Monitor shall keep the Chief Building Official (CBO) fully informed regarding safety related matters and coordinate with the CBO concerning on-site safety inspections, and a final safety inspection prior to issuance of the Certificate of Occupancy by the CBO. The Safety Monitor will be retained until cessation of construction and commissioning activities, and issuance of the Certificate of Occupancy, unless otherwise approved by the CPM.

The Safety Monitor(s) shall also:

- Correct any construction or commissioning problems that could pose a future danger to life or health, consulting with the CBO as necessary.
- After consultation with the CBO, have the authority to temporarily stop construction or commissioning activities involving possible safety violations or unsafe conditions that may pose an immediate or future danger to life or health, until the problem is resolved to the satisfaction of the Safety Monitor and CBO.
- Consult with the CBO to determine when construction may resume unless the problem is corrected immediately, and to the satisfaction of the Safety Monitor and/or CBO.
- Inform the CPM within 24 hours of any temporary halt in construction or commissioning activities.
- Be available to inspect the site whenever necessary in addition to the minimum weekly basis during construction and commissioning as determined in consultation with the CBO and CPM.
- Develop a safety program for the project that complies with Cal/OSHA & federal regulations related to power plant projects.
- Ensure that all federal and Cal/OSHA requirements are practiced during the construction and installation of all permanent structures (including safety aspects of electrical installations).
- Ensure that all construction and commissioning workers and supervisors receive adequate safety training.
- Conduct safety training (including fall protection, confined spaces, respiratory protection, hazard communication, etc.), or ensure that the project owner, union hall, and/or contractors conduct adequate safety training.
- Maintain all Material Safety Data Sheets, storage of all hazardous materials and all other required documentation for Cal/OSHA.
- Complete all accident and incident investigations, emergency response reports for injuries and inform the CPM of incidents.
- Ensure that all the plans identified in Worker Safety 1 are implemented.

The Safety Monitor shall be qualified regarding the following:

- Safety issues related to equipment, pipelines, etc,
- LORS applicable to workplace safety and worker protection
- Workplace hazards typically associated with power production
- Lock out tag out and confined spaces control systems
- Site security practices and issues

Verification: The project owner shall submit the Safety Monitor(s) resume(s) to the CPM for approval at least 30 days prior to site mobilization. One or more individuals may hold this position.

The Safety Monitor 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 that occurred during the month;

Report of any continuing or unresolved situations and incidents that may pose danger to life or health;

Report of accidents and injuries that occurred during the month.

REFERENCES

2001 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

Anderson, Steve. Life Safety/Hazmat Officer, City of Roseville Fire Department. Personal communication April 29, 2004.

City of Roseville Community Development Department (CRCD) 2004a. Major Project Conditions of Approval. Submitted to the Docket on August 16, 2004.

Ippolito, Tim. Assistant Fire Marshal, City of Roseville Fire Department. Personal communication, April 30, 2004.

Ippolito, Tim. Assistant Fire Marshal, City of Roseville Fire Department. (Ippolito 2004b) Personal communication, September 18, 2004.

Roseville Electric, Roseville, California (Roseville) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Kevin Robinson, Al McCuen and 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

Roseville Electric (RE) proposes to construct and operate a nominally rated 120-125 megawatt (MW) combined cycle power plant known as the Roseville Energy Park (REP). The project will be located in the City of Roseville, Placer County. The site will occupy approximately 12 acres of a 40 acre parcel within the City of Roseville and will lie in seismic zone 3. 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 Roseville and Placer County, respectively. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices 10-A through 10-D (RE 2003a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (RE 2003a, Appendices 10-A through 10-D). 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-D for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are 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 replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included 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 (RE 2003a, § 2.2.18.5) 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.

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 would ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This would 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 would 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 review the final designs, conduct plan checking and perform field inspections during construction. Energy Commission staff audit and monitor the CBO to ensure satisfactory performance.

RESPONSE TO COMMENTS

The following are the comments made on the **Facility Design** portion of the Preliminary Staff Assessment and staff's response to these comments:

Roseville Electric: Page 5.1-6, Proposed Condition of Certification **GEN-2** – RE requests the following items be removed from **Table 1**, Major Structures and Equipment List:

- Power Cycle Makeup and Storage Pumps Foundation and Connections – Delete because this is minor, not major, equipment.

- Cooling Tower Makeup Pumps Foundation and Connections – Delete because this is minor, not major, equipment.
- Closed Cycle Cooling Water Heat Exchanger Foundation and Connections – Delete because the REP will not have this feature. The REP will employ an open system.
- Waste Water Collection System Foundations and Connections – Delete because this is minor, not major, equipment.
- Natural Gas Metering Station Structure, Foundations and Connections – Delete because this is minor, not major, equipment.
- Gas Compressor Building Structure, Foundation and Connections – Delete because the REP will not have this feature.
- Sound Wall at Property Line – Delete because the REP will not be constructing a sound wall at the property line.
- HVAC and Refrigeration Systems – Delete because this is minor, not major, equipment.
- Temperature Control and Ventilation Systems (including water and sewer connections) – Delete because this is minor, not major, equipment.
- Electrical Duct Banks – Delete because this is minor, not major, equipment.

Staff's Response: Staff believes that the items identified as minor, not major by the Applicant, are actually major structures or equipment as defined by the 2001 CBSC. Therefore, these items will remain in **Table 1**.

The items identified as not part of the REP, by the Applicant, have been removed from Table 1.

Roseville Electric: In addition to the deletions, RE requests the verification timeline be modified from 60 to 30 days.

Staff's Response: The stated timeline is intended to allow the CBO adequate time to review and approve the submittal(s). If it becomes apparent that the project owner can respond to CBO comments quickly, the proposed language allows the project owner and CBO to agree to shorten the timeline to any appropriate period. The language need not be changed.

Roseville Electric: Page 5.1-9 – 5.1-12, Proposed Condition of Certification **GEN-5** – RE requests that any reference or requirement to use an Engineering Geologist be deleted. An Engineering Geologist is simply not required. The issues related to soil conditions and fill materials cannot be approved by an Engineering Geologist in California. An Engineering Geologist should only be used if there are unique geologic features such as active faults that require further field delineation. The REP site does not exhibit any unique geologic features that would require such further delineation. An Engineering Geologist cannot design foundations or approve construction. All of these services must be provided by or under the direct supervision of a geotechnical or civil engineer.

Staff's Response: Reference to the Engineering Geologist has been removed from **GEN-5** with the understanding that the project site does not contain bedrock or any other unique geological features. If bedrock or any other unique geological features are found at the REP site, and Engineering Geologist should be reinstated as required by the 2001 CBC section 3317.4.

City of Roseville: The City of Roseville submitted **Major Project Permit Conditions of Approval for the Roseville Energy Park**.

Staff's Response: General Conditions 9, 10, 11, 12, 13, 14, 16, 22, 23, 24, 40, 41, 42, and 65 are all addressed in proposed Condition of Certification **GEN-1** of the Facility Design section of the Staff Assessment. **GEN-1** states, "The project owner shall design, construct and inspect the project in accordance with the 2001 California Building Standards Code (CDSC)… and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval." The General Conditions listed above are all local LORS, which are incorporated as **other applicable engineering LORS** in **GEN-1**.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the 2001 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.

In the event that the initial engineering designs are submitted to the CBO when a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

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)
Combustion Turbine (CT) Foundation and Connections	2
Combustion Turbine Generator Foundation and Connections	2
Steam Turbine (ST) Foundation and Connections	1
Steam Turbine Generator Foundation and Connections	1
Steam Condenser and Auxiliaries Foundation and Connections	1
Heat Recovery Steam Generator (HRSG) Structure, Foundation and Connections	2
HRSG Feed Pumps Foundation and Connections	2
HRSG Stack Structure, Foundation and Connections	2
CT Main Transformer Foundation and Connections	2
ST Main Transformer Foundation and Connections	1
Auxiliary or Station Service Transformer Foundation and Connections	1
CT Air Inlet System Structure, Foundation and Connections	2
HRSG Transition Duct from CTG — Structure	2
Condensate Pumps Foundation and Connections	3
Circulating Water Pumps Foundation and Connections	2
Power Cycle Makeup and Storage Pumps Foundation and Connections	2
Cooling Tower Makeup Pumps Foundation and Connections	2
Demineralized Water Storage Tank and Pump Foundations and Connections	1
Condensate Storage and Transfer System Foundation and Connections	1
Condensate Water Tank Foundation and Connections	1
Auxiliary Cooling Water Pumps Foundation and Connections	2
Waste Water Collection System Foundation and Connections	1
Fuel gas Heater Foundation and Connections	1
Fire Protection System	1
Cooling Tower Structure, Foundation and Connections	1
Generator Breakers Foundation and Connections	3
Transformer Breakers Foundation and Connections	3
Natural Gas Metering Station Structure, Foundation and Connections	1
Natural Gas Compressor Skid Foundation and Connections	2
Ammonia Storage Facility Foundation and Connections	1
Closed Cycle Cooling Pumps Foundation and Connections	2
Demineralizer - RO System Foundation and Connections	2
Warehouse/Shop Structure, Foundation and Connections	1
Demineralized Water Treatment Structure, Foundation and Connections	1
Cooling Tower Blowdown Storage Tank, Foundation and Connections	1
Cooling Tower Chemical Feed Structure, Foundation and Connections	1
Auxiliary Boiler Foundation and Connections	1

Equipment/System	Quantity (Plant)
Ammonia Vaporizer System Foundation and Connections	1
Continuous Emissions Monitoring Systems Structure, Foundation and Connections	1
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan 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 increment of 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 those for the following items (from **Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and

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. 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

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Testimony of Patrick A. Pilling, Ph.D., P.E., G.E.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed Roseville Energy Park (REP) 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 Conditions of Certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The applicable Laws, Ordinances, Regulations and Standards (LORS) are listed in the Application for Certification (AFC), in Section 8.4.5, Table 8.4-3 and Section 8.8.5, Table 8.8-1 (ROSEVILLE, 2003a). The following is a brief description of the LORS for geologic hazards and resources, and mineralogic and paleontologic resources.

FEDERAL

The proposed REP is not located on federal land. As such, there are no federal LORS for geological hazards and resources or grading for the REP plant site.

STATE AND LOCAL

The project shall be designed and constructed to the 2001 edition of the California Building Standards Code (CBSC), in particular Part 2, the California Building Code (CBC). The CBC includes a series of standards that are used in project investigation, design and construction (including grading and erosion control).

The "Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures" (Society of Vertebrate Paleontology [SVP], 1995) is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the Society of Vertebrate Paleontology (SVP), a national organization of professional scientists.

SETTING

The proposed REP site is located in the lower Sacramento Valley, which is a subdivision of the Great Valley geomorphic province of California. The Great Valley is characterized by broad lowlands bounded by highly deformed rock units of the Coast Range to the west and the gently sloping western foothills of the Sierra Nevada mountains to the east.

This valley is filled with a thick sequence of marine and non-marine sedimentary rocks of Jurassic to recent age. The plant site has been mapped by the United States Geological Survey (Wagner et al., 1987) as being underlain by recent alluvium in the northeastern portion of the site and by the Riverbank Formation in the southwestern portion of the site. Recent alluvium is described as unconsolidated clay, silt, sand and gravel deposited by Holocene streams and rivers, and the Riverbank Formation is described as semi-consolidated, poorly-bedded layers of silt, clay, sand, and gravel deposited in a fluvial environment (URS, 2001a). Based on the results of exploration activities at the site (URS, 2001a), subsurface soils generally consist of medium dense to dense silty/clayey sand and stiff to hard sandy silt, silt, and silty clay. Perched ground water was reported to be present immediately south of the site at a depth between 4 and 6 feet below existing ground elevations, while static ground water south of the site was measured at a depth of 66 feet below existing ground elevations (España Geotechnical Consulting, 1999).

ANALYSIS AND IMPACTS

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

STAFF'S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

No federal LORS with respect to geologic hazards and geologic and mineralogic resources apply to this project; however, the CBSC and CBC 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.

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 operations, are reviewed to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as any site-specific information provided by the applicant, in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, Conditions of Certification are applied to project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

GEOLOGIC HAZARDS

The AFC (ROSEVILLE, 2003a) provides documentation of potential geologic hazards at the REP plant site, in addition to subsurface exploration information (URS, 2001a). Review of the AFC, coupled with our independent research, indicates the potential for geologic hazards to impact the plant site are low.

Our independent research included review of available geologic maps, reports, and related data of the REP plant site. Geological information was available from the California Geological Survey (CGS), 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, dated 1994 (CGS, 1994); the Geologic Map of the Sacramento Quadrangle (Wagner et al., 1987); the Simplified Fault Activity Map of California (Jennings and Saucedo, 2002); the Seismic Shaking Hazard Maps of California (Petersen et al., 1999); Summary of the Geology of the Great Valley (Hackel, 1966); and the Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada (International Conference of Building Officials [ICBO], 1998). The project is located within Seismic Zone 3, as delineated on Figure 16-2 of the CBC. The closest known Holocene (active) faults are associated with the Foothills Fault System located approximately 16 miles from the site and the Concord-Green Valley fault located approximately 60 miles from the site. Energy Commission staff has calculated an estimated deterministic peak horizontal ground acceleration for the active faults in the vicinity of the project, including the two closest faults noted above, as 0.12g. As this acceleration is less than that required by the CBC (0.3g), a peak ground acceleration of 0.3g would be appropriate for use in design of structures at this site.

Liquefaction

Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event. During the seismic event, cyclic shear stresses cause the development of excessive pore water pressure between the soil grains, effectively reducing the internal strength of the soil. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) and very soft silts lying below the ground water table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic

settlements of overlying structural improvements and lateral spreading of the liquefied layer when confined vertically but not horizontally.

Ground water was encountered during exploration in the vicinity of the plant site at a depth of 66 feet below existing ground elevations; however, shallow perched ground water levels and layers of medium dense silty sand were also encountered (España Geotechnical Consulting, 1999; URS, 2001a). Such layers could be susceptible to liquefaction during the design earthquake (España Geotechnical Consulting, 1999; URS, 2001a). As a result, additional exploration and analyses are necessary to accurately assess this potential geologic hazard as outlined in **GEO-1.**

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. Since the plant site is generally underlain by medium dense to dense silty sand and stiff to hard sandy silt, silt, and silty clay, the potential for dynamic compaction at the plant site is considered low.

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 is generally underlain by medium dense to dense silty sand and stiff to hard sandy silt, silt, and silty clay, the potential for hydrocompaction at the plant site 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 underlying soils, resulting in consolidation/settlement of the underlying soils. The REP will obtain cooling water from tertiary treated recycled waste water from the adjacent Pleasant Grove Waste Water Treatment Plant (PGWWTP). As such, draw down of the water table due to REP operations is not anticipated. As a result, the potential for ground subsidence is considered low.

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. As reported in the exploration logs, materials encountered in the project area consist of silty sand soils, as well as sandy silt, silt, and silty clay. The clay soils exhibit plasticity indices on the order 20 to 34, indicative of moderately expansive soils. As a result, there is a potential for expansive soils to be present near the surface of the site such that additional exploration and analyses are necessary to accurately assess this potential geologic hazard as outlined in **GEO-1.**

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 relatively low strength. Debris-flows are shallow landslides that travel downslope very rapidly as muddy slurry. The REP site is relatively flat with up to approximately 13 feet of relief over the plant site. As a result, the potential impact of landslides to the REP site is low.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which inundate low-lying areas adjacent to large bodies of water. The proposed site is situated approximately 82 to 95 feet above mean sea level and no large bodies of water are present near the REP site or associated alternative linear facilities. As a result, the potential for tsunamis and seiches to affect the site is considered negligible.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (CGS, 1980; Clark, 1998; CDMG, 1988; USGS, 1990; CDMG, 1999; DOGGR, 1982; Hackel, 1966; Helley and Harwood, 1985; Kohler, 2002; Wagner et al., 1987). Based on this information and the information contained in the AFC (ROSEVILLE, 2003a), there are no known geologic or mineralogic resources located at or immediately adjacent to the proposed REP site. The applicant's consultant conducted a paleontologic resources field survey and a sensitivity analysis for the REP site. No significant fossil fragments were observed at the REP site; however, paleobotanical fossils have been exposed in previous trenching operations near the site (URS, 2001b). The Riverbank Formation, which underlies the majority of the site, has been assigned a "high" sensitivity rating with respect to potentially containing paleontological resources. Based on this information and staff's review of available information (University of California, Berkeley, 2002), the proposed REP site has high potential to contain significant paleontologic resources.

PROJECT SPECIFIC IMPACTS

Seismicity represents the main geologic hazard at this site. Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the Facility Design section, as well as **GEO-1** of this section, should mitigate these impacts to a less than significant level. No geologic or mineralogic resources are known to exist in the area. Paleontologic resources have been documented in the area, and the (confidential) Paleontologic Resources Report (ROSEVILLE, 2003a) assigns a sensitivity rating of high for geologic units that underlie the proposed facility. Since the proposed project will include significant amounts of

grading and utility trenching, staff considers the probability that paleontologic resources will be encountered during mass grading of the REP site to be high based on SVP assessment criteria. 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.

CUMULATIVE IMPACTS

The REP site lies in an area that exhibits low geologic hazards and no known geologic or mineralogic resources. However, paleontogical resources have been documented in the area. The potential impacts to paleontological resources due to construction activities will be mitigated as required by 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, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low.

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 proposed project site. 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 will have been disturbed during construction and operation of the facility.

CONCLUSIONS AND RECOMMENDATIONS

Based on staff's analysis the applicant will be able to comply with all 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 adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section, and include **GEO-1** below. Paleontological conditions of certification follow.

GEO-1 The Soils Engineering Report required by the 2001 CBC Appendix Chapter 33, Section 3309.5 Soils Engineering Report, should specifically include data regarding the liquefaction potential and expansion potential of the site soils. The liquefaction analysis shall be implemented by following the recommended procedures contained in *Recommended Procedures for*

Implementation of California Division of Mines and Geology Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California dated March 1999.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which describes the collapse, expansion, and liquefaction potential of the site foundation soils and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

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 resumes 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 shall show the location, depth, and extent of all ground disturbances and should be of such as scale to allow the PRS to determine and map fossil occurrences. 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. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed schedule for the monitoring and sampling;
5. 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;
6. 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;

7. 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;
8. 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
9. A copy of the paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide two copies 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 and who have not previously had the training. 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.

The Worker Environmental Awareness Program (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 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 two copies of 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 an alternate paleontological trainer is requested by the project owner, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of the 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 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 consistently with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified. 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 program 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. 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 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 immediately (no later than the following morning after the find, or Monday morning in the case of a weekend) of any halt of construction activities.

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 shall address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the project construction.

Verification: The project owner shall maintain in 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**).A signed contract or agreement with the PRS shall be provided to the CPM upon request. 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.

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 of Worker Environmental Awareness Program
ROSEVILLE ENERGY PARK (03-AFC-1)

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. Please include this completed form in the Monthly Compliance Report.

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PaleoTrainer: _____ Signature:_____ Date: ___/___/____
Bio Trainer: _____ Signature:_____ Date: ___/___/____

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

INTRODUCTION

The Energy Commission, in its decision, must make findings as to whether energy use by the Roseville Energy Park (REP) 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 REP's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal LORS apply to the efficiency of this project.

STATE

No State LORS apply to the efficiency of this project.

LOCAL

No local or county ordinances apply to power plant efficiency.

SETTING

The applicant proposes to construct and operate the combined-cycle REP to generate 120 to 125 MW of baseload power (nominal net output, baseload) and 160 MW (nominal net output, peaking) of load-following power, providing power to the Roseville Electric customers (Roseville 2003a, AFC §§ 1.1, 2.1, 2.2.2, 2.2.16). (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.) As proposed, the REP will consist of two General Electric (GE) LM6000PC Sprint or two Alstom GTX100 combustion gas turbines with inlet air evaporative coolers, inlet air filters, two dual-pressure heat recovery steam generators (HRSGs) with duct burners, and a single 2-pressure, non-reheat, condensing steam turbine generator arranged in a two-on-one combined cycle train (Roseville 2003a, AFC

§§ 1.1, 2.2.2, 2.2.4). GE LM6000 gas turbines use a water injection system to increase power and lower NO_x emissions. Alstom GTX100 gas turbines use dry low-NO_x combustors to control NO_x emissions and use no water injection for either emissions control or increasing power output. The HRSGs will be equipped with selective catalytic reduction to control air emissions (Roseville 2003a, AFC §§ 1.1, 2.2.2, 2.2.4.1, 2.2.4.2, 2.2.11). Natural gas will be transmitted to the plant via an approximately 6-mile section of 10- to 16-inch diameter pipeline connected to PG&E's gas supply line 123 (Roseville 2003a, AFC §§ 1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1).

ANALYSIS

CEQA Guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient and unnecessary consumption of energy (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient and unnecessary consumption of fuel or energy.

Project Energy Requirements And Energy Use Efficiency

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Under average ambient conditions, the REP would burn natural gas at a nominal rate of 19,820 million Btu per day, lower heating value (LHV) without HRSG duct firing. (Roseville 2003a, AFC § 2.2.6). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected project conditions, using GE LM6000 gas turbines, at maximum baseload operation, 120 MW of electricity would be generated at an efficiency of approximately 50.5 percent LHV without duct burning (Roseville 2003a, AFC § 2.2.2, Figure 2.2-4). Under the same conditions, using Alstom GTX100 gas turbines, at maximum baseload operation, 125 MW of electricity would be generated at an efficiency of approximately 51.6 percent LHV without duct burning (Roseville 2003a, AFC § 2.2.2, Figure 2.2-5); compare these to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV. With duct firing, at average ambient conditions, REP would be able to generate a nominal output of 160 MW (using either the LM6000 or the GTX100 machines) (Roseville 2003a, AFC § 2.2.2). At this rate, the full load

efficiency would be approximately 35.7 to 38.6 percent LHV, which is comparable to, if not higher than, that of a gas turbine operating in simple cycle.

Adverse Effects On Energy Supplies And Resources

The applicant has described its sources of supply of natural gas for the project (Roseville 2003a, AFC §§ 1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1). Natural gas for the REP will be supplied from the existing PG&E gas distribution system from line 123. The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity. Furthermore, the PG&E gas supply represents an adequate source for a project of this size. A letter from PG&E that accompanied Data Response 39 confirms that PG&E's system will be able and ready to provide the necessary quantities of natural gas for the REP (CH2MHill 2004a). It is, therefore, highly unlikely that the project could pose a substantial increase in demand for natural gas in California.

Additional Energy Supply Requirements

Natural gas fuel will be supplied to the project by PG&E line 123 via a new approximately 6-mile section of 10- to 16-inch diameter pipeline (Roseville 2003a, AFC §§ 1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the REP will require the development of additional energy supply capacity.

Compliance With Energy Standards

No standards apply to the efficiency of the REP or other non-cogeneration projects.

Alternatives To Reduce Wasteful, Inefficient And Unnecessary Energy Consumption

The REP could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

As proposed, the REP will be configured as a combined cycle power plant, in which electricity is generated by two gas turbines, and additionally by a steam turbine that operates on heat energy recuperated from the gas turbines' exhaust (Roseville 2003a, AFC §§ 1.1, 2.1, 2.2.2, 2.2.3, 2.2.4). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or steam turbines operating alone. Such a configuration is well suited to the large, steady loads met by a baseload plant, intended to supply energy efficiently for long periods of time.

The applicant proposes to use inlet air evaporative coolers, HRSG duct burners (re-heaters), two-pressure HRSGs and steam turbine, and a circulating water system

(Roseville 2003a, AFC §§ 1.1, 2.2.2, 2.2.3, 2.2.4). Staff believes these features contribute to meaningful efficiency enhancement of the REP. The two-train combustion turbine (CT)/HRSG configuration also allows for high efficiency during unit turndown because a single fully loaded CT is more efficient than two CTs operating at 50 percent load.

The REP includes HRSG duct burners, partially to replace heat to the steam turbine (ST) cycle during high ambient temperatures when CT capacity drops, and partially as added power. Duct firing also provides a number of operational benefits, such as load following and balancing and optimizing the operation of the ST cycle.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. Both the GE LM6000PC Sprint and Alstom GTX100 turbines represent two of the most modern and efficient such machines within the aeroderivative class turbines now available. The applicant will employ two GE LM6000PC Sprint or two Alstom GTX100 gas turbine generators in a two-on-one combined cycle power train (Roseville 2003a, AFC §§ 1.1, 2.2.2, 2.2.4, 2.2.18.2). The GE LM6000PC Sprint gas turbine in a one-on-one configuration (the only configuration for which GTW combined cycle efficiency data is available) is nominally rated at 59 MW and 53 percent efficiency LHV at ISO conditions (GTW 2003). The Alstom GTX100 in a two-on-one configuration is nominally rated at 124.5 MW and 54 percent efficiency LHV at ISO conditions (GTW 2003).

Efficiency Of Alternatives To The Project

The project objectives include generation of baseload electricity and ancillary services, as market conditions dictate (Roseville 2003a, AFC §§ 1.3, 2.2.16, 2.2.18.1, 10.2.2).

Alternative Generating Technologies

Alternative generating technologies for the REP are considered in the AFC (Roseville 2003a, AFC § 9.6). Fossil fuels, geothermal, biomass, solar, hydroelectric, and wind technologies are all considered. Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-

line manufacturing, has made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

Roseville Electric has considered employing the GE LM6000PC Sprint or Alstom GTX100 gas turbine, two of the most modern simple cycle gas turbine generators available. The LM6000PC Sprint gas turbine generator in a one-on-one combined cycle power train is nominally rated at 59 MW and 53 percent LHV at ISO conditions (GTW 2003). The LM6000PC Sprint is further enhanced by the incorporation of spray intercooling (thus the name, SPRay INTercooling). This takes advantage of the aeroderivative machine's two-stage compressor. By spraying water into the airstream between the two compressor stages, the partially compressed air is cooled, reducing the amount of work that must be performed by the second stage compressor. This reduces the power consumed by the compressor, yielding greater net power output and higher fuel efficiency. The benefits in generating capacity and fuel efficiency increase with rising ambient air temperatures. At temperatures above 90°F, the Sprint machine enjoys a four-percent increase in both power output and efficiency (GTW 2000). The Alstom GTX100 gas turbine generator in a two-on-one combined cycle power train is nominally rated at 124.5 MW and 54 percent LHV at ISO conditions (GTW 2003).

One possible alternative that can meet the project's objectives is the FT8, which is an aeroderivative machine adapted from Pratt & Whitney aircraft engines. This machine in a two-on-one combined cycle power train configuration is nominally rated at 74 MW (baseload) and 51 percent efficiency LHV at ISO conditions (GTW 2003).

Another alternative is the General Electric frame 7EA (GE 7EA), which is nominally rated at 130 MW (baseload) and 50 percent efficiency LHV at ISO conditions in a one-on-one combined cycle configuration (GTW 2003).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
ALSTOM GTX100	**124.5**	**54 %**
GE LM6000PC Sprint	**56**	**53** %
P & W Twin FT8 Plus	74	51 %
GE 7EA	130	50 %

Source: GTW 2003

The alternative machines (P & W Twin FT8 Plus and GE 7EA) are slightly less efficient than both the LM6000 and the Alstom GTX100.

In order to meet the project's generating capacity requirement, the only configuration suitable for the GE 7EA would have to be a one-on-one configuration. This configuration, in comparison to the two-on-one configuration, would result in lower efficiency during unit turndown because a single fully loaded CT is more efficient than one CT operating at 50 percent load.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler or fogger, and the chiller; both devices increase power output by cooling the gas turbine inlet air. A

mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ inlet air evaporative cooling (Roseville 2003a, AFC §§ 2.2.2, 2.2.4.1, 9.6.4). Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (two-on-one combined cycle) and generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

There are no nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project will not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the project. The older, less efficient power plants consume more natural gas to operate than the new, more efficient plants such as the REP. The high efficiency of the proposed REP should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants, and therefore not having an impact or even reducing the cumulative amount of natural gas consumed for power generation.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator to ensure the efficient management of the system, all lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 120 to 125 MW of baseload electric power, and a nominal 160 MW of peaking power, at an overall project fuel efficiency between 35.7 percent LHV at maximum full load (with duct firing) and 51.6 percent LHV at maximum baseload (without duct firing). 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. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

No Conditions of Certification are proposed.

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POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While Roseville Electric has predicted a 95 percent annual availability for the Roseville Energy Park (REP) (see below), staff uses the benchmark identified above, rather than Roseville Electric's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, the Commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system (see **Setting** below).

SETTING

The responsibility for overseeing system reliability falls largely to the Western Electricity Coordinating Council (WECC), an entity that is responsible for coordinating and promoting electric system reliability throughout the nine western states. The WECC has reliability, operating, and planning standards, criteria and guidelines necessary to maintain the reliable operation of the Western Interconnection's interconnected bulk power system. As a member of the WECC, the applicant should adhere to the guidelines of the WECC and the North American Electric Reliability Council (NERC) in order to supply Roseville Electric's customers with a reliable source of power.

As part of its plan to provide needed reliability, the applicant proposes to operate the 160 MW (nominal peak load output) REP, providing power to the Roseville Electric customers (Roseville 2003a, AFC §§ 1.1, 2.1, 1.3). The project is expected to operate at an overall availability of 95 percent (Roseville 2003a, AFC §§ 2.2.2, 2.2.16), and at a capacity factor, over the life of the plant, of 30 to 100 percent of base load (Roseville 2003a, AFC §§ 2.2.18.1, 10.2.2).

ANALYSIS

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (Roseville 2003a, AFC §§ 2.2.18.1, 10.2.2), the REP will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the REP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (Roseville 2003a, AFC § 2.2.18.5) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in baseload service for long periods of time must be capable of being maintained while operating. A typical approach for achieving

this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the combined cycle portion of the project (Roseville 2003a, AFC §§ 1.1, 2.2.2, 2.2.4, 2.2.5, 2.2.13, 2.2.18.2, 10.2.2, Table 2.2-4). The fact that the project consists of two trains of gas turbine generators/HRSGs provides inherent reliability. Failure of a non-redundant component of one train should not cause the other train to fail, thus allowing the plant to continue to generate (at reduced output). Further, the plant's distributed control system (DCS) will be built with typical redundancy. Emergency DC and AC power systems will be supplied by redundant batteries, chargers, and inverters. Other balance of plant equipment will be provided with redundant examples, including:

- two 100 percent feedwater pumps per HRSG;
- three 50 percent condensate pumps;
- two 50 percent circulating water pumps; and
- three 50 percent natural gas compressors.

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (Roseville 2003a, AFC §§ 2.2.18.5, 10.2.2). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The REP will burn natural gas from the Pacific Gas and Electric (PG&E) distribution system. Natural gas will be transmitted to the plant via an approximately six-mile section of 10- to 16-inch diameter pipeline connected to the PG&E gas supply system (Roseville 2003a, AFC §§ 1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1). This PG&E natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas. A letter from PG&E that accompanied Data Response 39 confirms that PG&E's system will be able and ready to provide the necessary quantities of natural gas for the REP (CH2MHill 2004a). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The REP will obtain recycled water for cooling tower make-up from the City of Roseville's adjacent Pleasant Grove Waste Water Treatment Plant via a new 50-foot-long 12- to 24-inch diameter pipeline (Roseville 2003a, AFC §§ 1.1, 2.2.7, 2.2.18.4, 7.0). The applicant predicts average process and cooling water consumption of approximately 491 gallons per minute (gpm) at baseload under average ambient conditions. Potable water will be provided by an existing well located on the REP site, initially, and later by the City water main when the West Roseville Specific Plan is developed (TID 2002a, AFC §§ 1.1, 2.2.7, 7.0). Staff believes these sources yield sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) and flooding present credible threats to reliable operation.

Seismic Shaking

The site lies within Seismic Zone 3 (Roseville 2003a, AFC §§ 2.2.17.1, 8.4.1.5); see that portion of this document entitled **Geology, Mineral Resources, and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (Roseville 2003a, AFC §§ 2.2.17.1, 8.4, 10.2.2, Appendix 10). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

Flooding

Site average elevation is approximately 93 feet above mean sea level and the site is not within the 100-year flood plain. Storm Water Pollution Prevention Plan and Best Management Practices will be implemented during construction and operation to control erosion and sedimentation (Roseville 2003a, AFC §§ 2.2.17.1, 8.15.1.3, 8.15.4). Staff believes there are no concerns with the power plant functional reliability due to flooding events. For further discussion, see **Soil and Water Resources**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC

reports the following summary generating unit statistics for the years 1998 through 2002 (NERC 2003):

For Combined Cycle units (All MW sizes)
Availability Factor = 89.95 percent

The gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor of 95 percent (Roseville 2003a, AFC §§ 2.2.2, 2.2.16) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new machines can well be expected to outperform the fleet of various (mostly older) gas turbines that make up the NERC statistics. Further, since the plant will consist of two parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact power plant reliability. Reliability impacts on the electric system from facility closure, should there be any, are discussed in the **Transmission System Engineering** section of this document.

CONCLUSION

Roseville Electric predicts an equivalent availability factor of 95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No Conditions of Certification are proposed.

REFERENCES

CH2MHill, Sacramento, California (CH2MHill). 2004a. Applicant's Response to CEC Staff Data Request 39 (PG&E letter). Submitted to the Docket on February 6, 2004.

NERC (North American Electric Reliability Council). 2003. 1998-2002 Generating Availability Report.

Roseville (Roseville Electric). 2003a. Application for Certification for the Roseville Energy Park (03-AFC-1). Submitted to the California Energy Commission, October 30, 2003.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Al McCuen

SUMMARY OF CONCLUSIONS

Roseville Electric, the municipal electric utility of the City of Roseville, proposes to construct a nominal net generating capacity of 120 to 125 megawatt (MW), with the ability to peak-fire to 160 MW, natural gas-fired combined cycle generating facility. With a 60 kV switchyard, the Roseville Energy Park (REP or "project") would be located in the City of Roseville, Placer County. The project would connect to Roseville Electric's system via a new 100-foot 60 kV double circuit line. Staff concludes that the switchyard, outlet lines and termination are acceptable and will comply with applicable Laws, Ordinances, Regulations and Standards. No additional new transmission facilities other than those proposed by the applicant for the direct interconnection are required for interconnection of the REP. The marginal adverse impacts found in the Western and SMUD transmission grids due to interconnection of the REP can be mitigated effectively by Remedial Action Schemes, and operational procedures.

INTRODUCTION

The Transmission System Engineering (TSE) analysis identifies whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations, and standards (LORS), required for safe and reliable electric power transmission, and assesses whether or not the applicant has accurately identified all interconnection facilities required as a result of the project.

Staff's analysis evaluates the power plant switchyard, outlet lines, termination and downstream facilities identified by the applicant and provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Cal. Code Reg., tit. 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid. This evaluation must include any facilities beyond the project's interconnection with the existing transmission system, though such facilities are not under the permit authority of the Energy Commission, that are required as a result of the power plant addition to the California transmission system.

Because the Roseville Electric system is not a part of the California Independent System Operator (Cal-ISO) grid, the Cal-ISO is not directly responsible for ensuring electric system reliability for the generator interconnection and will not provide analysis and testimony for this project. However, staff coordinated with the Cal-ISO and solicited their input on this project. Staff, therefore, has increased responsibility to evaluate the

system reliability impacts of the project and provide conclusions and recommendations to the Energy Commission.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation, or use of overhead electric lines and to the public in general.
- Western Systems Coordinating Council (WSCC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria include the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).
- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. The NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Cal-ISO's Reliability Criteria also provide policies, standards, principles, and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid. It also applies when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO.

PROJECT DESCRIPTION

The REP project would be located on a 12-acre site. The fenced power plant area would encompass 9.1 acres, within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant. The generating facility would consist of two combustion turbines (CTG), each with an output of 43 to 47 MW (see Definition of Terms), one condensing steam turbine (STG) with an output of 30 MW, peak-fire using duct burners to 75 to 87 MW, and two heat recovery steam generators (HRSG) providing a nominal total generating capacity of 120 to 125 MW and with peak-fire to 160 MW (Roseville 2003a, pages 1-5, 2-1, 2-2, Figure 2.2-4). Full-scale commercial operation is expected by Jaunary 2007 (G&B 2004c, page 2).

POWER PLANT SWITCHYARD

The project contains two combustion turbine generators and one steam turbine generator. Each of the CTGs and the STG generate power at 13.8 kV, and each generator is connected to the plant 60 kV switchyard using its own dedicated 13.8/60 kV step-up transformer. The switchyard would consist of SF6 insulated circuit breakers and manually operated disconnect switches on each side of each breaker. A breaker-and-half bus arrangement would be used in the switchyard to obtain a high level of service reliability (Roseville 2003a Figure 6.1-2 and page 10D-1). Staff concludes that these facilities are acceptable.

TRANSMISSION LINE

The outlet transmission line would consist of a 100 foot-long new double-circuit, 60 kV transmission line, from the proposed REP on-site switchyard to the proposed West Roseville Specific Plan (WRSP) 60 kV double-circuit line, which would extend to the existing Fiddyment substation. The 60 kV outlet transmission line is proposed to be carried on double-circuit, single-pole steel structures. Each of the circuits would be 666.6 ACSS high temperature conductor with a normal summer rating of 125 megavolt amperes (MVA) and an emergency rating of 145 MVA (Roseville 2003a, page 6-1 and CH2MHill 2004a, page 4). As indicated in AFC Figure 6.1.2, a future line addition as part of the WRSP will connect a 60 kV double circuit transmission line from the WRSP substation to the REP switchyard. This configuration for the interconnection is in accordance with good utility practices and is considered acceptable.

EXISTING FACILITIES AND RELATED SYSTEMS

The City of Roseville recently approved the West Roseville Specific Plan. The WRSP includes construction of a new 60 kV double circuit transmission line that runs from the existing Fiddyment Receiving Station to a new WRSP substation along Phillip Road and passes adjacent to the REP. Power generated by the REP would be transmitted to the grid by looping two circuits of the WRSP transmission line into the REP switchyard. Construction of the new WRSP transmission lines is expected to be completed prior to interconnection of the REP project (Roseville 2003a page 1-7 and page 2-12).

SYSTEM RELIABILITY

For interconnecting proposed facilities to the grid, a System Impact Study and a Detailed Facility Study (DFS) are generally performed to determine the alternate and preferred interconnection methods. The studies also determine the downstream transmission system impacts, and the mitigation measures needed to conform with the system performance levels required by utility reliability criteria, NERC planning standards, WSCC reliability criteria, and Cal-ISO reliability criteria. The studies determine both positive and negative impacts and for the reliability criteria violations, determine the alternate and preferred additional transmission facilities or other mitigation measures. The studies are conducted with and without the new generation project and its interconnection facilities by using the computer model base case for the year the generator project would come on-line. The studies normally include a Load Flow study, Transient Stability study, Post-transient Load Flow study, and Short Circuit study. 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. The studies must be conducted under the normal condition (N-0) of the system and also for all credible contingency/emergency conditions, which includes the loss of a single system element (N-1) such as a transmission line, transformer, or a generator and the simultaneous loss of two system elements (N-2), such as two transmission lines or a transmission line and a generator. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power is available in the area system or area sub-system to which the new generator project would be interconnected.

Equipment that is loaded beyond 100 percent of its rating constitutes a violation of the reliability criteria. Generally voltages must be within 95 percent and 105 percent of the base level.

Scope of Detailed Facility Study

The transmission system was analyzed under the following system conditions:

- 2006 heavy summer base case with heavy load conditions in the greater Sacramento valley region.
- 2006 heavy summer case with the NCAP Roseville CT generating unit at 50 MW.
- 2006 spring base case without the 50 MW NCPA Roseville CT.

The study included Load Flow analysis, PV analysis, Dynamic Stability Studies, and Short Circuit studies.

Detailed Facility Study Summary

Power Flow Study Results

The Power Flow Study results indicate that interconnection of the REP causes no normal overloads in either the Heavy Summer or Light Spring analysis.

Contingency study of the 2006 heavy summer case indicated an improvement in transmission system performance with the addition of the REP. Before addition of the REP, the N-1 contingency study indicated 26 elements were overloaded. With the addition of the REP, only four overloaded elements remained. The loading of the 22 pre-existing overloaded elements dropped to within their ratings (CH2MHill 2004a, page 4).

The overloaded elements under N-1 contingencies include (CH2MHill 2004a, Table I):

Overloaded Facilities Under N-1 Contingency Summer Case (Without Roseville CT)	**Percentage Loading of the Facility**		**Percentage Increment in Loading**	**SELECTED MITIGATION**
	Pre-REP	**Post-REP**		
Hurley S 230 kV – Carmichael 230 kV circuit #1	109	113	4	Cal-ISO / SVSG T-121 Operating Procedures
Hurley S 230 kV – Natomas 230 kV circuit #1	108	109	1	
Tracy PMP 230 kV – Tesla D 230 kV circuit #1	108	110	2	
Tracy PMP 230 kV – Tesla D 230 kV circuit #2	108	110	2	
ElvertaW 230 kV – Hurley S 230 kV circuit #1	95	107	12	Western will re-rate these lines. If the re-rating is feasible, the emergency ratings will be increased and will fully mitigate the overload.
ElvertaW 230 kV – Hurley S 230 kV circuit #2	89	100	11	
REP60 60 kV – Fiddyment 60 kV #1	NA	110	10	Install a Remedial Action Scheme to reduce the REP output. The future WRSP transmission system addition will eliminate the overloads.
REP60 60 kV – Fiddyment 60 kV #2	NA	110	10	

The overloaded element under an N-2 contingency is the loss of the Elverta - Hurley line #1 and #2.

Overloaded Facility Under N-2 Contingency Summer Case (Without Roseville CT)	Percentage Loading of the Facility		Percentage Increment in Loading	SELECTED MITIGATION
	Pre-REP	Post-REP		
ElvertaS – ElvertaW 230 kV circuit #1	98	110	12	Cal-ISO / SVSG T-121 Operating Procedures

A Sensitivity study indicated that with NCPA's Roseville CT generating at 50 MW and with the REP, the REP would have minimal effect on the City's 60 kV and 230 kV transmission systems. The overloads under contingency conditions that appear in the 230 kV transmission system and are as follows (CH2MHill 2004a page 8).

Overloaded Facility Under N-1 Contingency Summer Case (with Roseville CT)	Percentage Loading of the Facility		Percentage Increment in Loading	SELECTED MITIGATION
	Pre-REP	Post-REP		
Hurley S 230 kV – Carmichael 230 kV circuit #1	109	113	4	Cal-ISO / SVSG T-121 Operating Procedures
Hurley S 230 kV – Natomas 230 kV circuit #1	108	109	1	
Tracy PMP 230 kV – Tesla D 230 kV circuit #1	108	113	5	
Tracy PMP 230 kV – Tesla D 230 kV circuit #2	108	113	5	
ElvertaW 230 kV – Hurley S 230 kV circuit #1	95	110	15	Western will re-rate these lines. If the re-rating is feasible, the emergency ratings will be increased and will fully mitigate the overload.
ElvertaW 230 kV – Hurley S 230 kV circuit #2	89	103	14	
REP60 60 kV – Fiddyment 60 kV #1	NA	110	10	Install a Remedial Action Scheme (RAS) to reduce the REP output. The future WRSP transmission system addition will eliminate the overloads.
REP60 60 kV – Fiddyment 60 kV #2	NA	110	10	

The Power Flow analysis for the spring case indicates that interconnection of the REP would not cause any criteria violations in the transmission facilities. Under an N-1 contingency, the overloaded elements are as follows:

Overloaded Facility Under N-1 Contingency Spring Case (Without Roseville CT)	Percentage Loading of the Facility		Percentage Increment in Loading	SELECTED MITIGATION
	Pre-REP	Post-REP		
REP60 60 kV – Fiddyment 60 kV #1	NA	110	10	Install a RAS to reduce the REP output. The future WRSP transmission system addition will eliminate the overloads.
REP60 60 kV – Fiddyment 60 kV #2	NA	110	10	

Mitigation Measures

As mentioned above, the selected mitigation measures for the contingency overload would be to implement the Cal-ISO / SVSG T-121 Operating Procedures, re-rate lines, install a RAS to reduce the REP output, and a future WRSP transmission system addition. The T-121 Operating Procedures (WAPA 2004a) includes:

- reduce generation north of Elverta;
- increase generation internal to SMUD; and
- reduce/shed load

Western is in the process of re-rating the Elverta-Hurley lines and working with SMUD to assure an adequate rating. Western and staff are confident that the rerating would be effective. Should the rerating not occur it is likely that operational mitigation measures not involving facility construction would be used. The WRSP will expand Roseville Electric's transmission infrastructure. A double circuit 60 kV transmission line will connect the REP switchyard to the WRSP substation. The future expansion will eliminate the contingency overload of the REP – Fiddyment line and improve reliability and security. This transmission expansion is independent of the REP.

PV Analysis Results

The PV analysis confirms no voltage criteria violation occurs after adding the REP. Addition of the REP to the transmission grid will improve the Sacramento area import capability and improve local area voltage support (CH2MHill 2004a, page 7). The provision of dynamic voltage support in the area and improved import capabability is considered by staff a local system benefit.

Dynamic Stability Study Results

Dynamic stability studies were previously conducted for year 2002 using a larger plant, the Roseville Energy Facility (900 MW), in the same general location to determine if it would create any instability and adverse impact on the stable operation of the transmission grid following selected disturbances (CH2MHill 2004a, page 8 & 9). The results indicate there are no transient stability concerns on the transmission system

following the selected disturbances for integration of the once proposed 900 MW Roseville Energy Facility. Thus, it is also concluded that the REP would not create any adverse impact to the transmission grid since the REP would produce a much smaller output.

Short Circuit Study Results

The short circuit studies were conducted to determine whether the REP project would result in overstressing the existing fault interruption rating of circuit breakers. The DFS showed that all of the existing circuit breakers are capable of handling the increase in fault level with the addition of the REP (CH2MHill 2004a, page 10).

CUMULATIVE IMPACTS

Since the REP project would be located in the load center of Roseville Electric's transmission system, and all the proposed facilities will be located within the proposed fence lines, the project will minimize potential cumulative impacts.

NOTEWORTHY PUBLIC BENEFITS

The addition of the REP project would alleviate 22 out of 26 of the pre-project existing overloads occurring under contingency conditions. The REP also improves transmission grid voltages and area import capability. The REP significantly improves the reliability performance of the Roseville Electric transmission system and its ability to meet the NERC planning standards and WSCC reliability criteria[2]. The addition of the REP also reduces import requirements by providing local generation.

FACILITY CLOSURE

PLANNED CLOSURE

Planned closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS, is considered sufficient to provide adequate safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the Transmission Owner (TO) to assure (as one example) that the TO's system would not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the transmission owner to maintain some power service via the outlet line to supply critical station service equipment or other loads.[3]

[2] Public Resources Code 25523 (h) requires the Commission to make a finding on Public Benefits including but not limited to environmental, economic and reliability

[3] These are merely examples, many more exist.

UNEXPECTED TEMPORARY CLOSURE

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (see **General Conditions Including Compliance Monitoring and Closure Plan**).

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, would be developed to assure safety and reliability (see **General Conditions Including Compliance Monitoring and Closure Plan**).

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes as follows:

- Addition of the REP would not cause any negative impacts on the PG&E transmission system that is part of the Cal-ISO transmission system.
- The REP would not cause any normal condition overloads to the transmission grid. Under contingency conditions, the REP project helps alleviate 22 out of 26 existing, pre-project overloads. The remaining overloads would be mitigated by rerating conductors, planned future transmission expansion and operational procedures.
- The REP switchyard and interconnection facilities to the transmission grid via a 60 kV line through the REP switchyard would be adequate and reliable. The power plant switchyard, outlet lines, and terminations are in accordance with good utility practices and are acceptable. Staff concludes that these facilities would comply with LORS, assuming the conditions of certification are met.
- Adding local generation such as the REP would improve local area voltage support and improves import capability. Adding the REP would not cause stability criteria violations.
- The existing circuit breakers are capable of handling the increase in fault level with the addition of the REP.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities shall conform to all applicable LORS including the requirements 1a) through 1j) listed below.

a) The project shall connect to the WRSP 60 kV double circuit lines of the Roseville Electric transmission system using about 100 foot of 60 kV double circuit transmission line. Interconnection will be executed through the power plant 60 kV switchyard located at the REP project site.

b) The project's 60 kV switchyard shall have a breaker and a half configuration.

c) The project conductors shall be sized to accommodate the full output from the project.

d) The power plant switchyard, outlet line and termination shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", National Electric Code (NEC) and related industry standards.

e) Breakers and busses in the power plan switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

f) 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.

g) Termination facilities to the Roseville 60 kV line shall comply with applicable Roseville Electric interconnection standards.

h) The project owner shall provide to the CPM:

i) The final Detailed Facility Study (DFS), if modified, including a description of new facilities, facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

ii)A letter from transmission owner(s) stating that the mitigation measures or projects for each criteria violation selected by the project owner are acceptable.

Verification: At least 30 days prior to the start of grading of the power plant switchyard or transmission facilities, the project owner shall submit to the CPM for approval:

Electrical one line diagrams signed and sealed by a registered professional electrical engineer in responsible charge (or other approval acceptable to the CPM), a route map, and an engineering description of equipment and the configurations covered by the requirements 1a) through 1j) above.

The Detailed Facilities Study (if modified) including a description of facility upgrades, operational mitigation measures and/or RAS or SPS. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The project owner shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one week prior to initial synchronization with the grid. The project owner shall contact the Cal-ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the Cal-ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-3 The project owner shall inform the CPM of any impending changes that may not conform to the requirements 1a) through 1j) of **TSE-1**, and have not received CPM approval, and request approval to implement such changes. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CPM.

Verification: At least 30 days prior to the construction of the power plant switchyard and transmission facilities, the project owner shall inform the CPM of any impending changes that may not conform to requirements 1a) through 1j) of **TSE-1** and request approval to implement such changes.

TSE-4 The project owner shall be responsible for the inspection of the transmission facilities during project construction, and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, CPUC GO-128, Title 8 of the California Code of Regulations, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, NEC, related industry standards and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project to the grid, the project owner shall transmit to the CPM an engineering description(s) and one-line diagrams of the “as built” facilities greater than 18 kV signed and sealed by the registered electrical engineer in responsible charge (or other verification acceptable to the CPM, such as a letter stating that the attached diagrams have been verified by the engineer). A statement, signed and sealed, attesting to conformance with CPUC GO-95 or NESC, CPUC GO-128, Title 8 of the California Code of Regulations, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, NEC, related industry standards and these conditions shall be provided concurrently.

REFERENCES

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. Submitted to the Docket on February 6, 2004.

Galati & Blek, Sacramento, California (G&B) 2004c. Roseville Electric's Supplemental Comments on the PSA. Submitted to the Docket on August 11, 2004.

NERC (North American Electric Reliability Council). 1998. NERC Planning Standards, September 1997.

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

Roseville Electric, Roseville, California (ROSEVILLE) 2003b. Supplement in Response to Data Adequacy Comments. Submitted to the Docket on December 8, 2003.

Western Area Power Administration (WAPA) 2004a. Responses to CEC questions regarding the Screening Study dated June 24, 2003. Submitted to the Docket on March 4, 2004.

WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

DEFINITION OF TERMS

AAC — All Aluminum conductor.

Ampacity — Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere — The unit of current flowing in a conductor.

Bundled — Two wires, 18 inches apart.

Bus — Conductors that serve as a common connection for two or more circuits.

Conductor — The part of the transmission line (the wire) which carries the current.

Congestion Management
Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports), would not violate criteria.

Emergency Overload
See Single Contingency. This is also called an L-1.

Kcmil or kcm

Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV)

A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop An electrical cul de sac. A transmission configuration which interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

Megavar One megavolt ampere reactive.

Megavars Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)

A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)

A unit of power equivalent to 1,341 horsepower.

Multiple Contingencies

A condition that occurs when more than one major transmission element (circuit, transformer, circuit breaker, etc.) or more than one generator is out of service

Normal Operation/ Normal Overload

When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition

See Single Contingency.

Outlet Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Overload Equipment that is loaded beyond 100 percent of its rating constitutes a violation of the reliability criteria.

Power Flow Analysis

A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies

overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power
: Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)
: A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SF6
: Sulfur hexafluoride is an insulating medium.

Single Contingency
: Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable
: Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

System Protection System
: See Remedial Action Scheme.

Switchyard
: A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating
: See ampacity.

TSE
: Transmission System Engineering.

Undercrossing
: A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild
: A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Testimony of James W. Reede, Jr., Ed.D

INTRODUCTION

This section considers potential alternatives to the construction and operation of Roseville Electric's (RE) proposed Roseville Energy Park (REP) project. The purpose of this alternatives analysis is to comply with California's environmental laws by providing an analysis of a reasonable range of feasible alternatives that could 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). In this Alternatives analysis, staff has analyzed different technologies and alternative sites that may reduce or avoid the identified significant impacts.

The purpose of staff's alternatives analysis is to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. To accomplish this, staff must determine the appropriate scope of analysis. Consequently, it is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding the significant impacts of the proposed project. To prepare this analysis, staff:

- identified the basic objectives of the project, provided an overview of the project, and described its potentially significant adverse impacts;
- identified and evaluated alternative sites (whether the alternative site mitigates the identified impacts of the proposed project and whether the alternative site creates impacts of its own);
- identified and evaluated technology alternatives to the project, including conservation and other renewable sources; and
- evaluated the impacts of not constructing the project, known as the No Project Alternative under CEQA.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulations Section 15126.6(a), provide 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. The California Environmental Quality Act (CEQA) states that an environmental document does not have to consider an alternative if its effect cannot be reasonably ascertained and if its implementation is remote and speculative (Cal.

Code Regs., tit. 14, §15125(d)(5)). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (City of Santee v. County of San Diego (4th Dist. 1989) 214 Cal. App. 3d 1438).

SITE SELECTION AND PROJECT OBJECTIVES

In choosing the proposed site the applicant used the site selection criteria listed below. According to the AFC, the applicant used the following criteria in choosing the proposed site (Roseville 2003a). Staff believes these criteria are appropriate for a screening level analysis of site alternatives. Roseville Electric's primary criteria for site selection and project objectives were:

- to improve the quality and reliability of electric service in Roseville by locating the plant within RE's service area, directly connected to the Roseville Electric distribution grid;
- to provide rate stability and reasonable cost to ratepayers by decreasing the City's dependence on short-term and long-term external power contracts;
- to gain better control over operational issues that may stem from transmission facilities in the Sacramento Valley region that experience congestion during peak periods;
- To locate generation in or near load centers so as to increase overall grid reliability; and
- To minimize environmental impacts from the power plant site itself as well as from the gas, water and transmission lines.

ANALYSIS OF ALTERNATIVE SITES

The REP would be located on an 8.9-acre site that lies within a 40-acre City of Roseville parcel. The project site is within the limits of the City of Roseville, adjacent to and north of the Pleasant Grove Waste Water Treatment Plant (PGWWTP). The project site is owned by the City of Roseville and is zoned Public/Quasi-Public. Surrounding land uses currently include ranching (agricultural grazing) and rural residential. The project area to the south, east, and west, however, is proposed for residential, industrial, and commercial development under the West Roseville Specific Plan (WRSP). The WRSP is a plan for annexation and development of 3,162 acres and was approved by the City Council in February, 2004. Build-out of the WRSP will take place over approximately 10 years.

RE identified and assessed the suitability of several other sites for the REP. As part of this assessment, sites that were less than eight acres in size were eliminated from further consideration because of their inability to support the project's space requirements.

Four potential sites that have sufficient land available were identified by the applicant. **Alternatives Figure 1** show the location of the alternative sites that are potentially suitable for construction of REP.

Site Selection Criteria

For comparison purposes, and to meet the requirements of CEQA and Title 20, alternative sites were chosen by the applicant that could feasibly attain most of the project's basic objectives.

The key siting criteria in considering alternative sites included the following factors:

- more than 1,000 feet from the nearest residential uses or other sensitive receptor;
- near the centers of demand for maximum efficiency and system benefit;
- land zoned for industrial use or heavy industry;
- access to tertiary treated waste water from the Dry Creek or Pleasant Grove Waste Water Treatment Plant for cooling water;
- near electrical transmission facilities;
- near reliable natural gas supply;
- a parcel or adjoining parcels of sufficient size for a power plant and construction laydown areas;
- site control (lease or ownership);
- minimum construction impacts to existing residences and businesses;
- feasible mitigation of potential environmental impacts.

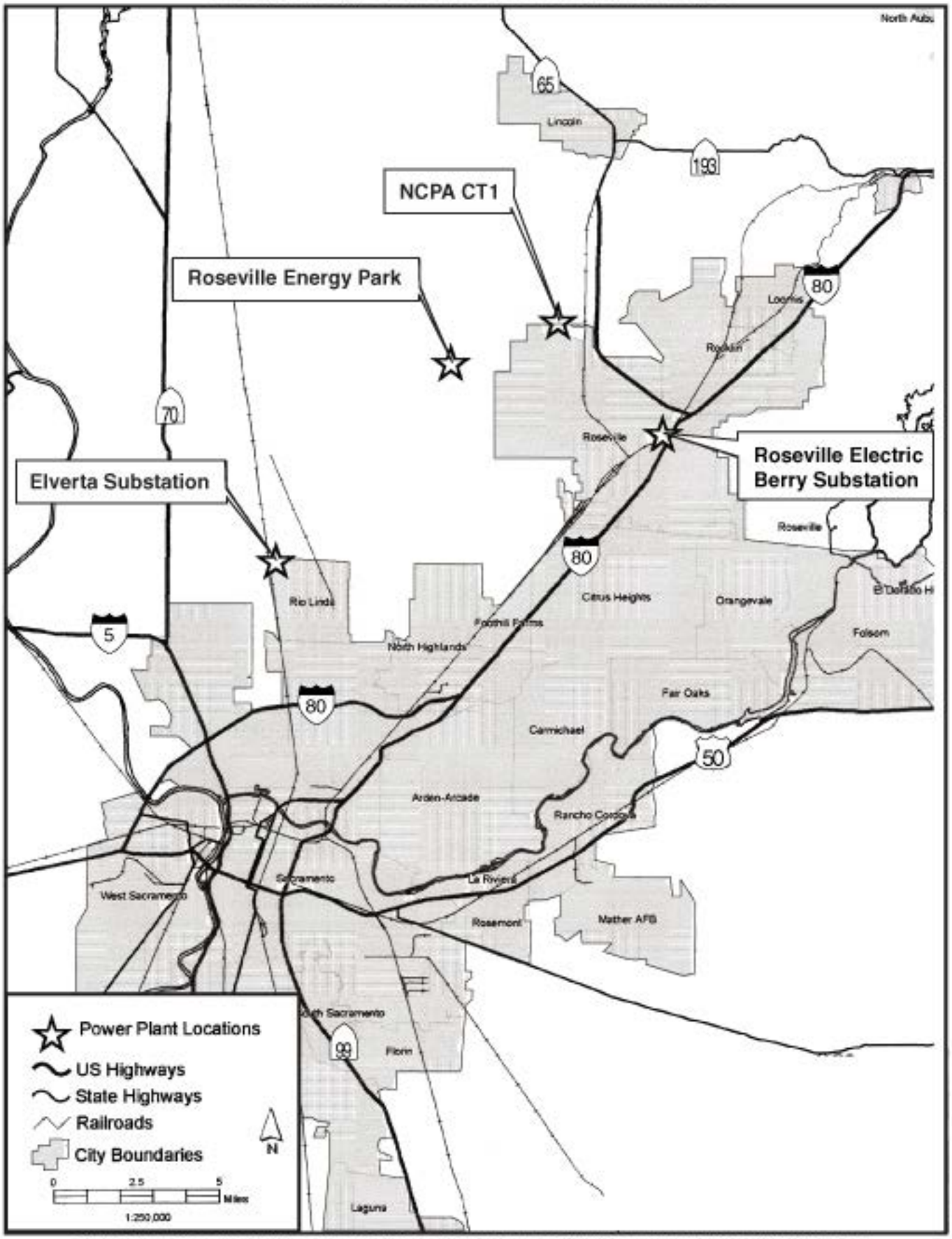
Site Descriptions

Roseville Energy Park Site (Proposed Project)

The proposed site for the REP on Phillip Road in Roseville, California met all of the project objectives identified by RE. According to RE this site was chosen because it is:

- located adjacent to a source of reclaimed waste water sufficient for plant cooling (the PGWWTP) such that a lengthy pipeline would not be necessary, thus reducing environmental effects;
- located near transmission facilities, the new 60 kV transmission line that will serve West Roseville, making it unnecessary to construct new transmission facilities, thus reducing environmental effects;

ALTERNATIVES - Figure 1
Roseville Energy Park - Alternative Power Plant Locations



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2004
SOURCE: Roseville Energy Park AFC, Figure 9.3-1

- zoned Public/Quasi-Public, which includes power generation as a permitted use;
- located 1.2 miles from the nearest residential area and 3 miles from sensitive receptors and, in combination with the West Roseville Specific Plan Area build-out, is located more than 1,000 feet from the nearest residential use or sensitive receptor;
- located where construction impacts to existing residences and businesses will be minimal; and
- the project site is owned by the City of Roseville and includes ample area for site construction, laydown, and staging.

Roseville Electric Berry Substation (Alternative Site #1)

The Roseville Electric Berry Substation site is located within a 25-acre parcel adjacent to Berry Road and Galleria Boulevard. The site is currently owned by the City of Roseville and is adjacent to RE's Berry Substation. Transmission lines are available from the Berry substation immediately to the south of the site. The site is currently vacant. Residential and commercial and industrial uses surround the site.

The site is zoned properly for electric generation but has existing residences approximately 500 feet to the west of the site. The site would have additional visual impacts since it is visible to several major transportation corridors, including interstate 80. Unlike the proposed site there have been no wetlands identified at this site. However, the site may provide limited foraging habitat for burrowing owls.

Staff agrees with the applicant that this site would require greater visual and noise mitigation than the proposed REP.

Elverta Substation (Alternative Site #2)

The Elverta Substation site is located on 90 acres in Elverta in northwestern Sacramento County. The site is west of the junction of U Street and Marysville Boulevard, just south of the Western Area Power Administration's Elverta Substation. The site is currently used for grazing. A rural residential area is located east and south of the site. Agricultural uses are to the west.

Unlike the proposed REP site and the Berry substation site, Roseville Electric does not have site control for this proposed alternative. The Everta Substation site, zoned for industrial use, is approximately 700 feet from the nearest residence and contains wetlands. This would result in impacts to protected species similar to the potential impacts identified at the proposed REP site. The site is the only proposed alternative that would not have access to recycled water.

Staff agrees with the applicant that this site would have similar biological impacts as the proposed site but would have additional impacts to water resources since recycled water is not available at this site.

NCPA CT-1 (Alternative Site #3)

The NCPA CT-1 site is located just north of the Roseville City limits in Placer County. The site is just north of the existing Northern California Power Authority Combustion Turbine facility NCPA CT-1 in an open area between newer housing developments to the west and an industrial area to the east. A housing development is under construction immediately south of the site.

Unlike the proposed REP site and the Berry substation site, Roseville Electric does not have site control for this proposed alternative. Residences are currently located approximately 500 feet from this site. The site is currently zoned for farming and, as a result, use of this proposed site would require the conversion of existing agricultural lands. According to the applicant, the site may contain wetlands and provides habitat for the burrowing owl and other foraging raptors.

Staff agrees with the applicant that this alternative will require additional noise mitigation to alleviate impacts to adjacent residences, has similar potential impacts to biological resources to those at the REP site, and would result in the conversion of existing farmlands.

Conclusion Regarding Alternative Sites

Staff has evaluated the alternative sites proposed by the applicant and finds that the alternative sites would have similar impacts to those identified at the proposed site and, in some cases, additional impacts due to the proximity of residences or an increased length of linear facilities.

Staff believes that, if the mitigation identified by staff in this FSA is implemented, the impacts of the construction and operation of the REP, at the proposed site, can be mitigated to an insignificant level for most technical areas. See table below.

Criteria	REP	Site #1	Site #2	Site #3
>1000 ft. to Residential	Yes	No	No	No
Near Center of Demand	Yes	Yes	Yes	Yes
Industrial Zoning	Yes	Yes	Yes	No
Access to Reclaimed Water	Yes	Yes	No	No
Proximity to Transmission Lines	Yes	Yes	Yes	Yes
Proximity to Natural Gas	Yes	Yes	Yes	Yes
Parcel Size	Yes	Yes	Yes	Yes
Site Control	Yes	Yes	No	No
Minimum impacts to nearby uses	Yes	No	Yes	No
Feasible mitigation of impacts	Yes	No	Yes	No

NO PROJECT ALTERNATIVE

The No Project Alternative under CEQA assumes that the REP 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)).

If the REP facility was not constructed, the proposed site, adjacent to the recently approved West Roseville Specific Plan (WRSP) area and the Pleasant Grove Waste Water Treatment Plant would likely be developed for some other industrial use. However, if the REP was not constructed, it would not contribute to Roseville Electric and California's electricity resources, increase competition, and help form a more reliable electric system.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives that did not satisfy the screening criteria for inclusion in a more detailed analysis, and include the following:

- simple or combined-cycle gas-fired plant
- demand side management;
- distributed generation; and
- other renewable resources.

These alternatives, and the reasons for their not being considered in detail in this analysis, are addressed below.

TECHNOLOGY ALTERNATIVES

Conservation and Demand-Side Management

Conservation and demand-side management (DSM) include a variety of approaches, including energy efficiency and conservation, building and appliance standards, load management and fuel substitution. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that addresses this issue is the Energy Commission's Integrated Energy Policy Report. Thus, such alternatives are not included in this analysis.

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered several alternative generation technologies including solar, wind, biomass, and hydropower.

Solar Generation

There are two types of solar generation: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation involves the conversion of solar radiation to thermal energy, which is then used to run a conventional steam power system. Solar thermal is a viable alternative to conventional generation systems and, depending on the technology, is suited to either distributed generation on the kW scale or to centralized power generation on scales up to several hundred MW. Solar thermal systems utilize three designs to generate electricity: parabolic trough concentrating collectors, power tower/heliostat configurations, and parabolic dish collectors. Parabolic trough and power tower systems typically run conventional power units, such as steam turbines, while parabolic dish systems power a small engine at the focal point of the collector.

PV power generation involves the direct conversion of light to electricity. PV is best suited to distributed generation uses rather than centralized power generation. PV is the most capital intensive of any alternative generation technology (Aspen 2001). PV power systems consist of solar electric modules (built from PV cells) assembled into arrays of varying sizes to produce electric power proportional to the area of the array and the intensity of the sunlight. PV arrays can be mounted on either the ground or on buildings. They can be installed on dual-purpose structures such as covered parking lots.

Solar resources would require large land areas in order to generate 160 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure such as the desert areas of California, central receiver solar thermal projects require approximately five acres per MW, so 160 MW would require approximately 800 acres. One square kilometer of PV generation (400 acres) can produce 100 MW of power, so 160 MW would require approximately 640 acres. Either of these technologies would use significantly more land area than the 12 acres required for the proposed REP.

Although air emissions are significantly reduced or eliminated for solar facilities, these facilities can have significant visual effects. Solar generation results in the absence or reduction in air pollutant emissions, and visible plumes. Water consumption for solar generation is substantially less than for a geothermal or natural gas fired plant because there is no thermal cooling requirement. In addition, the large avian populations, migratory bird pathways, and relatively large populations of threatened or endangered birds in an area would require careful analysis of potential impacts from either solar or PV generation at scale.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities and PV generation require near access to transmission lines. Large solar thermal plants must be located in desert areas with high direct normal insolation, and in these remote areas, transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar thermal power and photovoltaic power generation would not successfully meet the project objectives.

Wind Generation

Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's 1,700 MW of wind power represents 1.5 percent of the state's electrical capacity (Aspen 2001).

Although air emissions are significantly reduced or eliminated for wind facilities, these facilities can have significant visual effects. Wind turbines have also caused bird mortality (especially for raptors) resulting from collision with rotating blades although this effect is more noted in the Altamont Pass area than in other parts of the state.

Wind resources require large land areas in order to generate 250 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally can require between 5 and 17 acres to generate one megawatt (CEC 2004a). A 160MW plant would therefore require between 800 and 1,820 acres. Although 7,000 MW of new power wind capacity could cost-effectively be added to California's power supply, the lack of available transmission access is an important barrier to wind power development (Beck et al. 2001). California has a diversity of existing and potential wind resource regions that are near load centers such as San Francisco, Los Angeles, San Diego and Sacramento (CEC 2004b). However, wind energy technologies cannot provide full-time availability due to the natural intermittent availability of wind resources. Therefore, wind generation technology would not meet the project's goal, which is to provide load-serving capacity.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source) or agricultural waste. The fuel is burned to generate steam. Biomass facilities generate substantially greater quantities of air pollutant emissions than natural gas burning facilities. In addition, biomass plants are typically sized to generate less than 20 MW, which is substantially less than the capacity of the 160 MW REP project. At the peak of the biomass industry, 66 biomass plants were in operation in California, but as of 2001, only about 30 direct-combustion biomass facilities were in operation (CEC 2004c).

In order to generate 160 MW, ten 16 MW biomass facilities would be required. These power plants would have potentially significant environmental impacts of their own.

Hydropower

While hydropower does not require burning fossil fuels and may be available in California, this power source can cause significant environmental impacts, due primarily to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycles. In addition, planning and permitting time is on the order of 10 years. As a result, it is extremely unlikely that new large hydropower

facilities could be developed and permitted in California within the next several years (Aspen 2001).

Conclusion Regarding Alternative Technologies

Alternative generation typically has specific resource needs, environmental impacts, permitting difficulties, and intermittent availability. Therefore, these technologies do not fulfill a basic objective of the proposed project to provide load-serving capability in order to ensure a reliable supply of electricity for Roseville Electric and California. Consequently, staff does not believe that these renewable technologies present feasible alternatives to the proposed project.

Staff notes that Roseville Electric's resource mix currently encompasses a substantial contribution from alternative resources. Roseville Electric, for the fiscal year ending June 30, 2002, had annual sales of over 928 million kilowatt hours (kWh) to their 36,373 residential and 4,506 commercial customers (Roseville 2004a). For the calendar year 2002, Roseville Electric's resource mix included renewable resources (16 percent), coal derived electricity (6 percent), large hydroelectric generation (41 percent), natural gas-fired generation (28 percent), and nuclear power (8 percent) (Roseville 2004b).

CONCLUSIONS

Staff does not consider alternative technologies (solar, wind, biomass, and hydroelectric) to be feasible alternatives to the proposed project. While the No Project Alternative would eliminate all impacts of this project, including the benefits of increasing in-state generation and increased capacity for Roseville Electric. This would ensure that environmental impacts could be shifted to other power plant locations where impacts might be greater than those that would result from the construction and operation of the REP.

Staff has evaluated the alternative sites proposed by the applicant and finds that the alternative sites would have similar impacts to those identified at the proposed site and, in some cases, additional impacts due to the proximity of residences or an increased length of linear facilities.

Staff believes that, if the mitigation identified by staff in this Final Staff Assessment is implemented, the impacts of the construction and operation of the REP, at the proposed site, can be mitigated to an insignificant level.

REFERENCES

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GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Donna Stone

INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of 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;
- establish requirements for facility closure plans; and
- specify conditions of certification that follow each technical area that contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

SITE MOBILIZATION

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for construction utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for the occupants. Site mobilization is for temporary facilities and is, therefore, not considered construction.

GROUND DISTURBANCE

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

GRADING

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

a. the installation of environmental monitoring equipment;

b. a soil or geological investigation;

c. a topographical survey;

d. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; or

e. any work to provide access to the site for any of the purposes specified in a., b., c., or d.

START OF COMMERCIAL OPERATION[1]

For compliance monitoring purposes, "commercial operation" is that phase of project development which begins after the completion of start-up and commissioning, where the power plant has reached steady-state production of electricity with reliability at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

A Compliance Project Manager (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.

[1] A different definition of "Start of Commercial Operation," may be included in the Air Quality (AQ) section (per District Rules or Federal Regulations). In that event, the definition included in the AQ section would only apply to that section.

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 staff and management.

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.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

- all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- all monthly and annual compliance reports filed by the project owner;
- all complaints of noncompliance filed with the Energy Commission; and
- all petitions for project or condition changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A

summary of the General Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General Compliance Conditions (**COM-1, COM-2,** etc.) refers to the specific General Compliance Condition contained in **Compliance Table 1.**

GENERAL CONDITIONS OF CERTIFICATION

COM-1, Unrestricted Access

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the files and 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.

COM-2, Compliance Record

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.

COM-3, Compliance Verification Submittals

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.

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 mitigation or other evidence of mitigation.

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:

Donna Stone
Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

COM-4, Pre-Construction Matrix and Tasks Prior to Start of Construction

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 , and shall be submitted prior to the first pre-construction meeting, if one is held. It will be in the same format as the compliance matrix referenced 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 construction.

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.
It is 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 Final Decision.

EMPLOYEE ORIENTATION

Environmental awareness orientation and training will be developed for presentation to new employees during project construction as approved by Energy Commission staff and described in the conditions for Biological, Cultural, and Paleontological resources. At the time this training is presented, the project owner's representative shall present information about the role of the Energy Commission's delegate Chief Building Official

(CBO) for the project. The role and responsibilities of the CBO to enforce relevant portions of the Energy Commission Decision, the CBSC, and other relevant building and health and safety requirements shall be briefly presented. As part of that presentation, new employees shall be advised of the CBO's authority to halt project construction activities, either partially or totally, or take other corrective measures, as appropriate, if the CBO deems that such action is required to ensure compliance with the Energy Commission Decision, the CBSC, and other relevant building and health and safety requirements. At least 30 days prior to construction, the project owner shall submit the proposed script containing this information for CPM review and approval.

COMPLIANCE REPORTING

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

COM-5, Compliance Matrix

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition (e.g., "not started," "in progress" or "completed" (include the date); and
8. the project's preconstruction and construction milestones, including dates and status (if milestones are required).

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.

COM-6, Monthly Compliance Report

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date on which the project was approved, unless

otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List 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 five copies (or amount specified by Compliance Project Manager) 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 should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification;
4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;
5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. a listing of the month's additions to the on-site compliance file;
10. any requests, with justification, to dispose of items that are required to be maintained in the project owner's compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolutions of any resolved complaints, and the status of any unresolved complaints.

COM-7, Annual Compliance Report

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 which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings made to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file;
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 General 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 complaints, and the status of any unresolved complaints.

COM-8, Construction and Operation Security Plan

At least 14 days prior to commencing construction, a site-specific Security Plan for the construction phase shall be submitted to the CPM for approval. At least 30 days prior to the initial receipt of hazardous materials on-site, a site-specific Security Plan for the operational phase shall be submitted to the CPM for review and approval.

Construction Security Plan

The Construction Security Plan shall include the following:

1. site fencing enclosing the construction area;
2. use of security guards;
3. check-in procedure or tag system for construction personnel and visitors;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
5. evacuation procedures.

Operation Security Plan

1. The Operations Security Plan shall include the following:
2. permanent site fencing and security gate;
3. evacuation procedures;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. fire alarm monitoring system;
6. site personnel background checks, including employee and routine on-site contractors [Site personnel background checks are limited to ascertaining that the employee's claims of identity and employment history are accurate. All site personnel background checks shall be consistent with state and federal law regarding security and privacy.];
7. site access for vendors; and
8. 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 with personnel background security checks as per 49 CFR Part 1572, Subparts A and B.

In addition, the Security Plan shall include one or more of the following in order to ensure adequate perimeter security:

1. security guards;
2. security alarm for critical structures;
3. perimeter breach detectors and on-site motion detectors; and
4. video or still camera monitoring system.

The Project Owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the Security Plan. The CPM may authorize modifications to these measures, or may recommend additional measures depending on circumstances unique to the facility, and in response to industry-related security concerns.

COM-9, Confidential Information

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

COM-10, Department of Fish and Game Filing Fee

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of $850. The payment instrument shall be provided to the Energy Commission's Project Manager (PM), not the CPM, at the time of project

certification and shall be made payable to the California Department of Fish and Game. The PM will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision.

COM-11, Reporting of Complaints, Notices, and Citations

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded inquiries 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 of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (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 at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

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 remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

COM-12, Planned Closure

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

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.

In addition, 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.

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 Energy Commission approval of the facility closure plan is obtained.

COM-13, Unplanned Temporary Closure/On-Site Contingency Plan

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 the analysis 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 twelve 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).

COM-14, Unplanned Permanent Closure/On-Site Contingency Plan

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 unlikely 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.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction monitoring of the project, Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. 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.

Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental control 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. Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning 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 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request that the Energy Commission 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 of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 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 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 which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Chairman, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify project 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 Docket 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.

AMENDMENT

The project owner shall petition the energy commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to project 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.

COM-6, 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	
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	

TABLE 1
COMPLIANCE SECTION
SUMMARY of GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	PAGE #	SUBJECT	DESCRIPTION
COM-1	4	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-2	4	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.
COM-3	4	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether the condition was satisfied by work performed by the project owner or his agent.
COM-4	5	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until 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; and ▪ the CPM has issued a letter to the project owner authorizing construction.
COM-5	6	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.
COM-6	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 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.

CONDITION NUMBER	PAGE #	SUBJECT	DESCRIPTION
COM-7	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.
COM-8	8	Security Plans	Thirty days prior to commencing construction, the project owner shall submit a Security Plan for the construction phase. Sixty days prior to initial receipt of hazardous material on site, the project owner shall submit an Security Plan & Vulnerability Assessment for the operational phase.
COM-9	9	Confidential Information	Any information the project owner deems confidential shall be submitted to the Dockets Unit with an application for confidentiality.
COM-10	9	Dept of Fish and Game Filing Fee	The project owner shall pay a filing fee of $850 at the time of project certification.
COM-11	9	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COM-12	10	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least twelve months prior to commencement of a planned closure.
COM-13	11	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.
COM-14	12	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.

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 Energy Commission 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.)

ROSEVILLE ENERGY PARK
PREPARATION TEAM

Executive Summary ..... James W. Reede, Jr., Ed.D

Introduction ..... James W. Reede, Jr., Ed.D

Project Description ..... James W. Reede, Jr., Ed.D

Air Quality ..... Joe Loyer

Biological Resources ..... Stuart Itoga

Cultural Resources ..... Gary Reinoehl

Hazardous Materials ..... Geoff Lesh, P.E. and Rick Tyler

Land Use ..... David Flores

Noise and Vibration ..... Shahab Khoshmashrab, Kevin Robinson, and Steve Baker

Public Health ..... Obed Odoemelam, Ph.D.

Socioeconomics ..... Joseph Diamond, Ph.D.

Soil and Water ..... Richard Latteri

Traffic and Transportation ..... James Adams and Eileen Allen

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Eric Knight

Waste Management ..... Ellie Townsend-Hough

Worker Safety and Fire Protection ..... Geoff Lesh, P.E. and Rick Tyler

Facility Design ..... Kevin Robinson, Al McCuen and Steve Baker

Geology and Paleontology ..... Patrick A. Pilling, Ph.D., P.E., G.E.

Power Plant Efficiency ..... Shahab Khoshmashrab

Power Plant Reliability ..... Shahab Khoshmashrab

Transmission System Engineering ..... Laiping Ng and Al McCuen

Alternatives ..... James W. Reede, Jr., Ed.D

Compliance Monitoring and Facility Closure ..... Donna Stone

Project Assistant ..... Evelyn Johnson

Support Staff ..... Keith A. Muntz

DECLARATIONS
And
RESUMES

DECLARATION OF
James Adams

I, James Adams:

1. I am presently employed by the California Energy Commission in the **Environmental Office** of the Systems Assessments and Facilities Siting as a **Traffic and Transportation Analyst**.

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 **Traffic and Transportation**, for the **Roseville Energy Park** 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: 11/9/04 Signed: James Adams

At: Sacramento, California

James S. Adams
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 654-3882
Jadams@energy.state.ca.us

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics and traffic and transportation.

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 Redwood Alliance before the California Public Utilities Commission regarding the decommissioning of the Humboldt Bay Power Plant's nuclear reactor.

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 legal/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
EILEEN ALLEN

I, **EILEEN ALLEN** declare as follows:

1. I am presently employed by the California Energy Commission in the **ENVIRONMENTAL OFFICE** of the Systems Assessments and Facilities Siting as a **SENIOR PLANNER** supervising the Land Use and Traffic & Transportation section.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the **TRAFFIC AND TRANSPORTATION** and **LAND USE Conditions of Certification**, for the **Roseville Energy Park** 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: 11/12/04 Signed: Eileen Allen

At: Sacramento, California

EILEEN ALLEN

EDUCATION

B.A. Rhetoric, University of California Berkeley, 1977

M.A. Environmental Planning and Management, University of California Los Angeles, 1979

EXPERIENCE

CALIFORNIA ENERGY COMMISSION - 1987 to present
Senior Planner, Land Use and Traffic/Transportation Unit

Duties include supervising the work of staff analyzing the potential impact of proposed electric power plants on land use and traffic/transportation resources. Other duties include reviewing and editing staff's written testimony, supervising staff reviewing project compliance documents, issue identification and project strategy with project managers, attorneys, and other senior staff, and preparing weekly summaries of the permits required for proposed power plant projects.

Project manager, Energy Facilities Siting and Environmental Protection Division

Duties include directing the work of multidisciplinary teams analyzing potential impacts of the Huntington Beach, East Shore, Newark, Otay Mesa, San Francisco Energy Cogeneration, Livingston Pioneer, and Enron Pittsburg proposed power plants. Other duties include writng alternatives analyses for the Otay Mesa, High Desert and Sunrise power plant projects; leading public workshops for the above projects; writing the land use analysis for the Harper Lake power plant project; managing the Division's contribution to the Commission's 1992 and 1994 Electricity Reports; local government grant management; and legislative/CEQA analysis.

ENVIROSPHERE COMPANY - 1985 to 1987

Resources planner, Sacramento Office

Duties included analyzing the land use impacts of the California-Oregon Transmission Project, and the Devil's Nose hydroelectric project; and analysis of traffic and transportation impacts for the Midway-Sunset Cogeneration project, report and proposal writing.

CALIFORNIA DEPARTMENT OF CONSERVATION - 1981 to 1985

Acting Program Manager, Farmland Mapping and Monitoring Program

Duties included acting as program manager; chief contact for local elected officials, and county/city planning departments, and managing the local review process for draft farmland maps. This role involved oral presentations to 40 County Boards of Supervisors and conducting numerous public workshops.

DECLARATION OF
Dr. Joseph Diamond

I, **Joseph Diamond** declare as follows:

1. I am presently employed by the California Energy Commission as a Planner II-Economist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Socioeconomics** for the Roseville Energy Park 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: 11/9/2004 Signed: Dr. Joseph Diamond

At: Sacramento, California

Dr. Joseph Diamond
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
DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the **Land Use and Traffic and Transportation Unit** of the 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 **Land Use**, for the **Roseville Energy Park 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: 11/9/04 Signed: 

At: Sacramento, California

DAVID FLORES

WORK EXPERIENCE

Sept. 1998 to Present — **Planner I.** California Energy Commission, Energy Facilities Siting and Protection Division.

- Provide technical analysis of proposed energy planning, conservation, and development programs on land use, visual and traffic and transportation resources. Specific tasks include the analysis of potential impacts, identification of suitable mitigation measures, preparation of testimony, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

March 29,1988 to September 12, 1998 — **Senior Planner.** County of Yolo Planning and Public Works Department

Senior Planner - Current and Advanced Planning (Resources Management and Planning)

Present responsibilities include the following:

Administer the establishment of Planning schedules and timeframe completion schedules; Administration and staff support to Planning Commission and Board of Supervisors; Staff support and liaison to citizen's committees. Preparation of Environmental documents (Negative Declarations, preparation of Environmental Impact Reports and Categorical Exemptions) in accordance with State and Federal Regulations.

PLANNING ACHIEVEMENTS

- Principal staff involved in development of the County Right to Farm and Williamson Act/ Blue Ribbon Ordinances.
- Staff liaison to citizen committees for the communities of Yolo County
- Substantial experience in working successfully with community organizations and committees on controversial projects.
- Responsible for the administration of the California Environmental Quality Act (CEQA) for all matters going before the Planning Commission and Board of Supervisors.

EDUCATION

California State University @ Sacramento
University of California @Davis
Major: Environmental Studies
Minor: Business Administration

Continuing education has included: Writing for Managers, CEQA Updates, Managing the Office, CEQA Update, Subdivision Map Act, General Plan Update

DECLARATION OF
Stuart Itoga

I, **Stuart Itoga,** declare as follows:

1. I am presently employed by the California Energy Commission in the Biological Resources Unit of the Energy Facilities Siting and Environmental Protection Division as an Energy Analyst.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Biological Resources, for the **Roseville Energy Park** 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 Stuart Itoga Signed: 11/15/04

At: Sacramento, California

STUART ITOGA
Planner I

EDUCATION

B.S. Degree in Wildlife Management, Humboldt State University, Arcata, CA. December 1995.

A.A. Degree in Liberal Arts, West Valley College, Saratoga, CA. June 1991.

Post Graduate Education, Humboldt State University, Arcata, CA. August 1997- August 1998.

EXPERIENCE

Planner I, California Energy Commission, May 2002- Present. Currently assigned to the Systems Assessment and Facilities Siting Division, Biological Resources Unit. Through written and oral testimony, meetings, and workshops I assess thermal power plant applications for compliance with applicable laws, ordinances, standards and regulations.

Energy Analyst, California Energy Commission, March 2001- May 2002. I was assigned to the Systems Assessment and Facilities Siting Division, Biological Resources Unit, participating in the certification of thermal power plants. Through the review of project data, workshops and data requests, assess the potential impacts to biological resources associated with proposed projects and prepare written testimony.

Fish and Wildlife Technician, California Department of Water Resources, March 2000-March 2001. Coordinated the removal and repair of various fish screens throughout the south delta. Prepared a study plan for a corrosion and biomass accumulation study comparing different materials used for fish screens. Participated in various studies including stable isotopes, habitat use of the Chinese mitten crab and population studies of delta smelt, splittail and chinook salmon.

Biological Science Technician, U.S. Forest Service, June 1996-September 1999. As one of two field biologists assigned to an interagency black bear population study, utilized radio telemetry techniques and GPS technology to track and capture black bears in northern California. I was the principal investigator for a survey of sylvatic plague in Siskiyou County, California.

Fish and Wildlife Scientific Aid, Department of Fish and Game, February 1996-August 1997. Assisted with habitat management for breeding and wintering waterfowl and shorebirds. Conducted various sensitive species surveys and provided informational services to the public. Began working on black bear population study in the summers of 1996 and 1997.

Biological Science Technician, National Biological Service, March 1995-February 1996. Participated in a Mourning dove nesting ecology study and assisted in the design and implementation of a waterfowl behavioral study.

Wildlife Assistant, Humboldt State University, October 1993-January 1995. Assisted in a red fox and fisher food habits study and assisted with the operation of a MAPS mist netting station.

Biological Science Technician, U.S. Forest Service, May-August 1994. Acted as the fisheries crew leader collecting data to assess the effects of cattle grazing on riparian areas. Also prepared a report on the effects of a fire retardant spill on endemic fish species.

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 Systems Assessment and 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 **ROSEVILLE ENERGY PARK 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 testmony 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 9, 2004 Signed: S. Khoshmashrab

At: Sacramento, California

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 Systems Assessment and 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 prepared the staff testimony on **RELIABILITY**, for the **ROSEVILLE ENERGY PARK 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 testmony 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 9, 2004 Signed: S. Khoshmashrab

At: Sacramento, California

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 Systems Assessment and 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 prepared the staff testimony on **EFFICIENCY**, for the **ROSEVILLE ENERGY PARK PROJECT** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 9, 2004 Signed: S. Khoshmashrab

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

Eric Knight

I, Eric Knight declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as a Planner II.

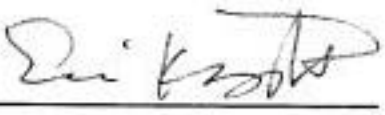
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Visual Resources, for the Roseville Energy Park 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: 11-10-04 Signed: 

At: Sacramento, California

ERIC KNIGHT

Planner II

EDUCATION

BA – Environmental Studies, California State University, Sacramento, 1993
Minor – Government, CSUS, 1993

PROFESSIONAL EDUCATION

CEQA Workshop, Association of Environmental Professionals, February 2004 and 1999
CEQA Overview and Update, UC Davis Extension Program, June 1998
Land Use Planning for Environmental Professionals, UC Davis Ext., May 1996
Introduction to ArcView and Avenue (GIS), ESRI, August 1995 and May 1998

EXPERIENCE

June 2000 to present

California Energy Commission, Systems Assessment & Facilities Siting Division, Environmental Protection Office
Planner II (Planner I from October 1998 to June 2000)

Responsible for preparing, or overseeing the preparation of, independent analyses of the potential visual and land use impacts of power plant projects and identifying measures to mitigate significant environmental effects. Other responsibilities include reviewing power plant applications for data adequacy, conducting field reconnaissance, writing information requests, participating in workshops with applicants and the public, preparing written testimony, presenting oral testimony at hearings, and monitoring compliance with conditions of certification.

June 1995 – October 1998

California Energy Commission, Energy Facilities Siting & Environmental Protection Division, Engineering Office
Energy Analyst/Planner I

Promoted the use of urban planning tools by local governments. Assembled a GIS database for a community-planning project in San Diego. Authored a chapter to the National Wind Coordinating Committee's handbook *Permitting of Wind Energy Facilities*. Helped to write, edit and review various Energy Commission publications.

June 1994 – June 1995

Department of Toxic Substances Control, California EPA
Program Technician
(Student Assistant: March 1993 – January 1994)

Provided regulatory assistance to hazardous waste generators, transporters and storage facility operators.

January 1992 – June 1992

Sacramento Valley Toxics Campaign
Student Intern

Filed public record requests with state and federal agencies. Conducted research and authored an article for the campaign newsletter. Helped to organize community meetings, press conferences and public outreach events.

DECLARATION OF
Richard W. Latteri

I, **Richard W. Latteri** declare as follows:

1. I am presently employed by the California Energy Commission in the **Systems Assessment and Facility Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Soil and Water Resources** for the **Rosevile Energy Park** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and scurces, 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 10, 2004 Signed: 

At: Sacramento, California

RESUME

Richard W. Latteri

System Assessment & Facilities Siting Division
California Energy Commission
1516 Ninth Street, MS 40
Sacramento, CA 95814
(916) 651-8859

PROFESSIONAL EXPERIENCE:

2001-Present ***California Energy Commission – Planner II:*** Technical specialist with the Environmental Office providing analysis of water and soil resources for proposed energy facilities. Specific tasks include the analysis of potential impacts, identification of suitable 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, Generation/Transmission 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
Geoffrey Lesh

I, **Geoffrey Lesh** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Energy Facilities Siting and Environmental Protection Division as a **Mechanical Engineer.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Hazardous Materials Management and the Worker Safety and Fire Protection Sections** for the **Roseville Energy 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 X Geoffrey Lesh Signed: 11/9/04

At: Sacramento, California

Geoffrey Lesh, P.E.
Mechanical Engineer

WORK HISTORY

California Energy Commission Mechanical Engineer 2002 - Current
- Review and analyze applicants' plans for safe management of hazardous materials, and for protecting worker safety.

Self-Employed Independent Investor 2000 - 2002
- Wrote market analysis computer software and traded personal account.

Read-Rite Corp Wafer Engineering Manager 1994 - 2000
- Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation.
- Managed process and equipment selection for manufacturing processes.
- Processes included vacuum processed metals and ceramics, grinding-polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting.

Dastek Corp (Komag Joint Venture Start-up) Wafer Engineering Manager 1992 - 1994
- Developed wafer processes for new technology recording head for hard disk drives.
- Managed team of engineers and technicians.
- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

Komag, Inc Alloy Development Manager 1989 - 1992
- Developed new vacuum-deposited recording alloys
- Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations.
- Extensive process modeling and data analysis.

Verbatim Corp (Kodak) Process Development Manager 1983 - 1989
- Mechanical engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic-plastic processes for optical disk development.
- Production processes included plating, metal evaporation, reactive sputtering, laser-based photolithography, injection molding.
- Steering Committee Member, *Center for Magnetic Recording Research, UC San Diego*

IBM Corp Mechanical/Process Engineer 1977 - 1983
- Product development for photocopiers and computer tape-storage systems.

EDUCATION

Stanford University, Master of Science Degree	Materials Science and Engineering
UC-Berkeley, Bachelor of Science Degree	Mechanical Engineering,
(Double Major)	Materials Science and Engineering
University of Santa Clara, Graduate Certificate	Magnetic Recording Engineering
Registered Professional Engineer, California	Mechanical #M32576
	Metallurgical #MT1940

DECLARATION OF
Rick Tyler

I, **Rick Tyler** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Energy Facilities Siting and Environmental Protection Division as a **Sr. Mechanical Engineer.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I directed the preparation of the staff testimony on **Hazardous Materials Management and the Worker Safety and Fire Protection Sections** for the **Roseville Energy 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: _____ Signed: 10/4/04

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION
430 Ashore Ave.
Sacramento, California 95831
(916) 392-1663

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 - Associate 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.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Joseph M. Loyer

I, Joseph M. Loyer declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Air Quality, for the Roseville Energy Park 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: 11-12-04 Signed: _____

At: Sacramento, California

QUALIFICATIONS

Joseph M. Loyer

EDUCATION:

Bachelor of Science in Mechanical Engineering
California State University, Sacramento. May 27, 1989

WORK EXPERIENCE:

June, 1993 to Present

I am currently employed in the Systems Assessment and Facilities Siting Division of the California Energy Commission as an Associate Mechanical Engineer. My responsibilities include air quality analysis in siting, compliance and policy work. I have worked on many siting cases and assisted in several modeling efforts. I have extensive experience with various compliance issues and have authored several policy papers for publication.

DECLARATION OF
Al McCuen

I Al McCuen declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and 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 helped prepare the staff testimony on Transmission System Engineering for the Roseville Energy Park based on my independent analysis of the Small Power Plant Exemption and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Nov 16 2004 Signed: Al McCuen

At: Sacramento, California

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 Systems Assessment and 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 participated in and supervised the preparation of the staff testimony on **FACILITY DESIGN** and **NOISE AND VIBRATION**, and supervised the preparation of the staff testimony on **POWER PLANT EFFICIENCY** and **POWER PLANT RELIABILITY**, for the **ROSEVILLE ENERGY PARK 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: 11/9/04 Signed: Steve Baker

At: Sacramento, California

DECLARATION OF

Al McCuen, Kevin Robinson and Steve Baker

We the undersigned, declare as follows:

1. We are presently employed by The California Energy Commission in the **Engineering Office** of the Systems Assessment and Facility Siting Division as

   Senior Electrical Engineer-Mr. McCuen, Mechanical Engineer-Mr. Robinson and **Senior Mechanical Engineer-Mr. Baker.**

2. Copies of our professional qualifications and experience are attached hereto and incorporated by reference herein.

3. We prepared our respective portions of the Staff Testimony on **Facility Design**, for the **Roseville Energy Park Project** based on our independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and our professional experience and knowledge.

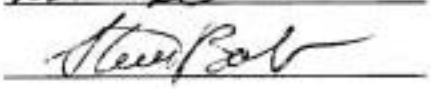
4. It is our professional opinion that the prepared Testimony is valid and accurate with respect to the issues addressed therein.

5. We are personally familiar with the facts and conclusions related in the Testimony and if called as witness(es) could testify competently thereto.

We declare under penalty of perjury that the foregoing is true and correct to the best of our knowledge and belief.

Al McCuen 

Kevin Robinson 

Steve Baker 

Dated: November 09, 2004

At: Sacramento, California

DECLARATION OF
KEVIN ROBINSON

I, **Kevin Robinson**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Systems Assessment and 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 co-authored the staff testimony on **NOISE AND VIBRATION** for the **ROSEVILLE ENERGY PARK 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 s 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: 11-9-04 Signed: 

At: Sacramento, California

Albert A. McCuen
SENIOR ELECTRICAL ENGINEER

Education

A.S., Electronic Engineering, College of the Siskiyous, Weed, CA
B.S., Electrical Engineering, California State University, CA

Professional Background

1990 to present--Senior Transmission Planner for Regulatory Transmission Engineering, Electrical Engineering, and Transmission System Evaluation. Special consultant for Transmission Safety and Nuisance discipline.

1987 to 1989--Supervisor of Transmission Evaluation Unit for Transmission Safety and Nuisance, Electrical Engineering, Transmission Engineering and Transmission System Evaluation technical disciplines.

1978 to 1987--Transmission System Program Specialist/Health and Safety Program Specialist, California Energy Commission (CEC), Siting and Environmental Division.

Expert witness for the Commission's power plant approval process and Commission staff transmission planner. Major assignments in transmission engineering and transmission system planning. Duties emphasize determination of the adequacy, acceptability and relative merit of applicant proposals for major transmission facilities (and staff proposed alternatives) in consideration of economics, reliability, conformance with transmission system planning criteria and coordination of regional transmission and generation facilities. Major assignments have also included scoping macro transmission policies for California, Developing Commission transmission system planning regulations and guidelines, developing common forecasting methodology for transmission system planning utility reporting.

1977 – 1978--Manager, Transmission Line Effects Section, CEC, Compliance and Safety Office.

Research, analysis and evaluation of public heath, safety and nuisance concerns for transmission lines. Duties included engineering calculations of transmission line electrical effects, review and assessment of technical publications and health, safety and nuisance standards.

1976 – 1977--Energy Facility Siting Planner, CEC, Compliance and Safety Office

Research and evaluation of existing material and health and safety standards applicable to thermal power plants and transmission lines. Responsible for coordination of expert witness to testify at hearings, preparation of cross examination questions, analysis of impact of effects and preparation of staff summary reports on Notice of Intent(s) and hearing testimony.

1969 – 1976--Electrical Engineering, Private firm - Electrical, Mechanical and Systems Engineering Construction Contractor. Engineering duties and coordination responsibilities for the construction of power plants, switchyards, power lines, industrial buildings and process control systems. Responsible for code and specification interpretation and compliance, design, project cost estimates and installation.

KEVIN ROBINSON
Mechanical Engineer

Experience Summary

Four years experience in the electric generation field, including mechanical design, QA/QC and construction of hydroelectric plant systems; and engineering and pclicy analysis of geothermal, natural gas-fired and thermal power plant regulatory issues.

Education

- California State University, Chico—Bachelor of Science, Mechanical Engineering
- Certified EIT, California

Professional Experience

2001 to Present—Mechanical Engineer, Systems Assessment & Facility Siting Division, Engineering Section – California Energy Commission

Responsible for analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural engineering aspects of power plant siting cases.

2000 to 2001—Mechanical Engineer, Oroville Field Division, Engineering Section – California Department of Water Resources

Assist in the preparation of designs, technical specifications and cost estimates for mechanical equipment at a hydroelectric power plant. Coordinate the design, installation, and inspection of mechanical equipment. Assist in preparing test reports, and recommendations for corrective action.

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty 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 6/30/06

Professional Experience

1990 to Present--Senior Mechanical Engineer, Siting & Environmental Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, 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

Dr. Obed Odoemelam

I, Obed Odoemelam declare as follows:

I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the Systems Assessments and Facilities Siting Division as a **Staff Toxicologist**.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on **Transmission Line Safety and Nuisance** for the **ROSEVILLE ENERGY PARK** based on my independent analysis of the Small Power Plant Exemption 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 issue 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: 11/16/04 Signed: Odoemelam

At: Sacramento, California

DECLARATION OF

Dr. Obed Odoemelam

I, Obed Odoemelam declare as follows:

I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the Systems Assessments and Facilities Siting Division as a **Staff Toxicologist**.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on **Public Health** for the **ROSEVILLE ENERGY PARK** based on my independent analysis of the Small Power Plant Exemption 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 issue 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: 11/4/04 Signed: Odoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
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 Systems Assessment and 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 helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY**, for the **ROSEVILLE ENERGY PARK** 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 10, 2004 Signed: 

At: Reno, Nevada

PATRICK A. PILLING, Ph.D., P.E., G.E.

Executive Vice President
Principal Geotechnical Engineer

Education

- B.S. – Civil Engineering –1986 – Santa Clara University
- M.S. – Civil Engineering – 1991 – San Jose State University
- Ph.D. – Civil Engineering – 1997 – 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, "Development 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, "Documentation 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, "Lateral 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, "The 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, "Strain Wedge Model Formulation for Piles," Report No. CIS 91-11, University of Nevada, Reno.

Pilling, P. A., 1997, "The 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, "Dependent 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, "Expansion 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
JAMES W. REEDE, JR., Ed.D

I, **James W. Reede, Jr.**, declare as follows:

1. I am presently employed by the California Energy Commission in the **FACILITY SITING OFFICE** of 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 authored the staff testimony on **ALTERNATIVES, PROJECT DESCRIPTION, INTRODUCTION,** and the **EXECUTIVE SUMMARY** for the **ROSEVILLE ENERGY PARK 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: 11/29/4

At: Sacramento, California

Signed: JWReede

James W. Reede, Jr., Ed.D

JAMES W. REEDE, JR., Ed. D

6008 Wynnewood Way - Sacramento, CA 95823
(916) 399-1133(v) - (916) 399-1137(f)
j.reede@att.net

EDUCATION

General Engineering	U.S. Military Academy		1971
Electrical & Electronics Technology	Community College of the Air Force	Certificate	1973
Organizational Behavior	University of San Francisco	BS	1979
Public Policy & Administration	California State University – Sacramento	MPPA	1998
Organization & Leadership in Public Mgmt.	University of San Francisco	Ed.D	2003

PROFESSIONAL TRAINING

Process Control Engineering	General Electric Technical Training Services	1974-1976
Manufacturing Management	General Electric Management Training Services	1978-1980
	Professional Designation - American Management Assoc.	1980
Boardsmanship Academy	California School Boards Association	1982-1987
Contract Management	U.S. Air Force Institute of Technology at WPAFB	1986-1988
	Professional Designation - National Contract Mgmt Assoc.	1988
Federal Managers Training Institute	Office of Personnel Mgmt., U.S. Government	1986-1989
City Management Academy	City of Sacramento	1995
Adjunct Faculty Academy	University of San Francisco	1999
California Environmental Quality Act	UC Davis Extension	2000-2003
Planning for Higher Education Facilities	UC Davis Extension	2002

PROFESSIONAL EXPERIENCE

ENERGY FACILITY SITING PROJECT MANAGER II

California Energy Commission Feb 2000-Present

I manage the state permitting process for thermal electric power plants from the initial filing of the Application for Certification through the issuance of the final operating permit. Coordinate the efforts of other agencies and twenty-three technical discipline staff for project certification, compliance and permitting related to the California Environmental Quality Act requirements. Recommend actions, policies, and procedures affecting the licensing of projects and commission program direction.

PUBLIC UTILITIES REGULATORY ANALYST III

California Public Utilities Commission Aug 99-Jan 2000

Performed technical and analytical research as well as consultative and advisory services in the areas of economics, finance and policy. Analyzed, evaluated, developed and recommended research methodologies and alternatives on energy related regulatory issues. Reviewed utilities' applications for revenue in various proceedings. Evaluated proposed legislation and advised Commission on potential impacts. Provided expert advice on Electric deregulation issues and testimony in support of and on behalf of the Commission.

ADJUNCT PROFESSOR

CSU Sacramento, University of San Francisco & National University Feb 99-Present

I instruct both undergraduate and graduate students in Environmental Science, Human Resources, Operations and Production Management, State & Local Government, Public Administration, Land Use and Public Policy courses.

SACRAMENTO MUNICIPAL UTILITY DISTRICT Jan 92-Jan 99

A. Senior Contract Administrator

Developed and issued a variety of construction and professional services solicitations and evaluated responses. Negotiate, award and manage contracts. Review and approve invoices. Developed the database to track Energy Services contracts. Responsible for all General Services, Facilities and construction contracts and budgets. Reviewed pending legislation to determine impact on District activities.

B. Key Accounts Contract Specialist (Temp Assignment) Feb 98-Oct 98

Develop customized power contracts for use with the District's medium and large Commercial and Industrial customers. Negotiated customer rate agreements and implemented deregulation requirements into customer service contracts. Identify potential customers for Key Account targeting and develop profiles for retention in the District's base load. Functioned as a Key Account Rep for small customers.

EDUCATION & MANAGEMENT CONSULTANT (*Self-Employed*) June 90-June 99

Provided statewide technical assistance for the California Department of Education Gender Equity Section at various school districts in the areas of minority populations, non-traditional careers, entrepreneurship, and At-Risk Youth. Successfully wrote grant proposals for Carl D. Perkins Vocational & Applied Technology Education Act funding. Developed a Manufacturing Studies curriculum for the Vocational Education Division of the California State Department of Education. Served on the CDE Editorial Advisory Board for the textbook "Visions: Rites of Passage for Young African-American Men." Advised and assisted small businesses in the development and submittal of bids and aided in contract and business management.

DEFENSE LOGISTICS AGENCY March 87-May 90

A. Chief, Production & Industrial Resources

Managed the Production and Industrial Resources Branch in San Diego, which monitored 835 contractors and 6,400 contracts worth $28 Billion. Responsible for production related matters such as contract performance, pre-award surveys, technical analysis of cost proposals, and progress payment reviews. Supervised the work of 27 staff that included 18 Industrial Engineers and Specialists, 7 Contract Mgmt. Assistants and 2 clerks. Interfaced with the Pricing, Engineering, Property, Contract Administration, and Transportation Branches on a daily basis. Reviewed a wide range of technical reports and analyzed data to identify production trends. Performed employee appraisals. Developed annual budget for staff and operations. Collateral duties were to establish the new San Diego Headquarters. Responsible for the site search, solicitation of lessors, the office layout, procurement of furniture, coordination of utilites installation, and logistics of the agency move.

B. Industrial Specialist Nov 85-Mar 87

Managed the contracts at the GTE residency office in Mt. View, CA. Performed in-plant production surveillance, witnessed RADAR & SONAR Systems testing, analyzed cost proposals, performed pre-award surveys, reviewed progress payment requests, verified proper use of Government owned equipment, and was part of the contract negotiation team.

CALIFORNIA PUBLIC UTILITIES COMMISSION Jun 84-Dec 84

QA Engineer - SEA Consultants

Reviewed a utility's electricity rate hike request to determine costs to be borne by users from a QA/QC cost avoidance perspective. The contract involved review of a utility's construction documents for 2 nuclear plants and determining what costs could have been avoided had QA/QC and management oversight activities been timely or properly implemented.

GE3 CORPORATION May 81-Nov 85

Project Manager / VP Projects / Principal

Planned, budgeted and installed Wind-Farm projects valued in excess of $30 million. Negotiated utility contracts for the sale of electricity. Supervised the Architect-Engineer for the site civil and electrical project requirements. Responsible for land leasing, planning, development, governmental interface, construction bids and contracts, procurement, and public relations. Responsible for compliance with regulatory requirements of CEQA and other state and federal laws.

GENERAL ELECTRIC NUCLEAR DIVISION Jun 74-May 81

Process Control Engineer / Supervising

Responsibilities were in the fields of electrical/electronic nuclear control and instrumentation manufacture and test. Duties included writing Quality Plans, Inspection & Test Instructions, Material Review Board Chair, Process Monitoring, Test Technician training and liaison with the Nuclear Regulatory Commission staff during audit to verify compliance with 10CFR50. Beginning in 1978, supervised 79 electro-mechanical inspectors, electrical/electronic testers and 2 test directors. This three-year assignment was for the assembly, factory test, shipment and on-site start-up testing of the control rooms for the Perry Nuclear Power Stations I & II (Ohio) and the Clinton Nuclear Generating Station (Illinois).

U. S. AIR FORCE Honorable Discharge May 10, 1974 Service-Connected Disabled Veteran

PAPERS PRESENTED

2003 DOCTORAL DISSERTATION "*Environmental Obstacles to Construction of Educational Facilities in California.*" University of San Francisco, May 2003, San Francisco, CA.

1998 MASTER'S THESIS "*A Comparative Case Study of the Response by the Sacramento Municipal Utility District to the Deregulation of the California Electric Utility Industry.*" California State University - Sacramento, Fall 1998, Sacramento, CA.

1998 *"California Special Districts, - History, Policies and Future Problems."* California State University - Sacramento, Spring 1998, Graduate Studies Symposium, Sacramento CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor.*" National Alliance of Black School Educators, Workshop Presenter, National Convention, Reno, Nevada.

1997 "*Black Creativity and Science-The Genius of the African-American Inventor.*" International Conference on Black Creativity, Presenter, Morgan State University, Baltimore MD.

1997 "*African-American Contributions to Railroad Development in the US.*" California State Railroad Museum, Guest Lecture Series, Sacramento, CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor.*" Portland Community College, Black History Month Guest Lecturer, Portland, OR.

1997 " *Black Inventors Won the West.*" Black Cowboy Museum, Guest Lecturer, Denver, CO.

1996 "*African-American Women Inventors.*" Annual Convention of the National Postal Women's Network, Oakland, CA.

1996 "*African-American Inventors - The Legacy.*" University of the Pacific, Black History Month Lecturer, Stockton, CA.

1992 "*The 1991 Redistricting Project, Reapportionment Success in Sacramento County.*" UC Berkeley, Guest Lecturer, Berkeley, CA.

1989 "*Production Management Techniques for Monitoring of Large Defense Contractors.*" Defense Logistics Agency, Alexandria, VA.

1982 "*Utilization of a Public Domain Design in the Manufacture of Wind Electric Generators.*" American Wind Energy Association, National Convention, Portland, OR.

1981 "*Blacks in Energy-In or Out?*" Congressional Black Caucus Energy Braintrust, Washington, DC.

1981 "*Blacks in Energy-In or Out?*" American Assoc. of Blacks in Energy, National Convention, Denver, CO.

1978 "*Process Control Techniques in the Manufacture of Nuclear Control Rooms.*" American Society for Quality Control, Portland, OR.

1977 "*Compliance with 10CFR50 in the Manufacture of Nuclear Controls and Instrumentation.*" American Society for Quality Control, Los Angeles, CA

AWARDS

2003 Outstanding Doctoral Student	University of San Francisco	May 2003
1996 Community Service Award	Sacramento Urban League	Oct. 1996
1995 Human Rights Award	Human Rights / Fair Housing Comm., City & County of Sacto.	Sept.1995
1994 Outstanding Community Leader	Sacramento County	Feb. 1994
1993 Alumni Achievement Award	Kappa Alpha Psi Fraternity	Mar. 1993
1992 NAACP Achievement Award	Region IX NAACP Annual Conference	Oct. 1992

COMMUNITY SERVICE

Planning Advisory Council Vice Chairman	Sacramento County Franklin-Laguna Planning Area	2000-Present
Committee Member	Teacher Recruitment Committee Elk Grove Unified School District	1999-Present
Advisory Board	Manufacturing & Product Technology Academy Elk Grove Unified School District	1994-1996
Board of Directors	North Laguna Creek Neighborhood Association	1994-Present
Board of Directors	FamiliesFirst Foster Care Agency	1993-Present
Board of Directors	Habitat for Humanity	1993-1995
Vice-President	Sacramento NAACP	1994-1996
Chairman	Dance Theater of Harlem U.C. Davis Community Outreach Campaign	1992 & 1994
Member	Vocational Education Advisory Council Sacramento City Unified School District	1992-1997
Member	Minority Advisory Council KCRA-3, KXTV-10, & KOVR-13	1992-1998
Commissioner & Vice-Chair	Human Rights/Fair Housing Commission City & County of Sacramento	1992-1994
Chairman	Community Advisory Committee Sacramento Regional Transit South Line	1992-1996
Co-Chairman	Black College Faire	1992-2000
Advisor/Consultant	Gender Equity Division California Dept. of Education	1991-1995
Co-Chairman	No. Calif. African-American Young Male Conference	1991-1997
Chairman	United Negro College Fund Northern California Campaign	1992-2000
Chairman	African-American Student Career Conference	1991-1996
Co-Chairman	1991 Redistricting Project	1991-1993
Board of Directors	Western Province Kappa Alpha Psi Fraternity	1991-1994
Polemarch (President)	Kappa Alpha Psi Fraternity	90/96-00/01
Political Action Chair	Sacramento Branch NAACP	1990-1994
Chairman, Member	Relocation Appeals Hearing Board City of San Jose	1985-1987
Committee Member	California School Boards Association Legislative & Small School Districts Committee	1983-1987
Director & Officer	California Coalition of Black School Board Members	1982-1987
Board Member	Mt. Pleasant School District San Jose, Calif.	1982-1987
Housing Commissioner	City of San Jose	1981-1987

INSTRUCTIONAL HISTORY
COURSES TAUGHT

COLLEGE LEVEL COURSES

1. Operations & Production Management	National University	Mar 99, Oct 00 & Jan 01
2. Performance Measurement Systems	National University	April 1999
3. Training for Organizations	National University	June 1999
4. Public Policy Analysis	University of San Francisco	June/Aug 1999
5. Personnel Procurement & Placement	National University	July 1999
6. State & Local Government	National University	Sept 99, Apr 01 & May 01
7. Government & Community Relations	National University	Oct 1999
8. Public Finance & Grants Admin	National University	Feb & Nov 2000
9. Managing for Productivity & Quality	National University	Mar & May 2000
10. Urban Planning & Technology	National University	Sept 00 & May 01
11. Seminar in Urban Affairs	National University	Sept 99, May 00 & Apr 01
12. Intro to Environmental Science	CSU – Sacramento	Sept 2003

WORKSHOPS AND TEACHER IN-SERVICE

1. Inclusion of Black Inventors into Social Science, History and Science curricula.	1994 - Present
2. Teaching the Patent and Trademark Process to Students.	1994 - Present
3. Inclusion of Careers in Technology into Life Skills lesson plans.	1991 - 1995
4. Non-Traditional Careers	1991 - 1995
5. Organizing Non-Traditional Career Fairs	1991 - 1995
6. The Integration of Career and Life Planning with academics.	1991 - 1995
7. Understanding the Young African-American Male in the School Environment	1991 - 1995

PROFESSIONAL TRAINING COURSES TAUGHT

1. Basic & Advanced Contract Administration	1988 - 1990
2. Principles of Cortract Pricing	1988 - 1990
3. Basic & Advanced Defense Contract Negotiations	1987 - 1990
4. Defense Contract Production Monitoring I & II	1987 - 1990
5. Operating Costs, Budgets & Measurements	1987 - 1990
6. Developing a Permitting Process for Wind Generators.	1981 - 1984
7. Nuclear Control Room Testing	1974 - 1981
8. Inspection techniques for Nuclear Control and Instrumentation	1974 - 1981

California CBEST Passed **February 1999**
USF Adjunct Academy **Oct / Dec 1999**

DECLARATION OF
Gary Reinoehl

I, Gary Reinoehl declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the System Assessment 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 Cultural Resources Section, for the Roseville Energy Park 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: 11/9/04 Signed: 

At: Sacramento, California

Gary L. Reinoehl
19387 Ponderosa Drive
Pioneer, CA 95666
(209) 295-5589
email: garreb@volcano.net

Education

School	Field	Degree	Year
Portland State University	Major: Mathematics Minor: Anthropology	Bachelor of Arts	1969
Sonoma State University	Cultural Resources Management	Master of Arts	1998

Experience

State of California, California Energy Commission *2000 to present*
Planner
Duties: Review cultural resources studies submitted to the Commission by energy permit applicants. Write data request in accordance with Commission regulations. Assess eligibility of cultural resources under California Register of Historical Resources criteria. Write Preliminary and Final Staff Assessments for cultural resources, including conditions for the permit to assure the impacts to cultural resources are minimized to be less than significant, if possible. Develop mitigation measures to minimize impacts to cultural resources. Review and evaluate the work of consultants. Provide testimony to commissioners in Evidentiary Meetings. Work with other staff to draft changes in the Commission regulations. Review and provide comments to Compliance Project manager regarding compliance with Conditions of Certification. Consult and coordinate with staff from other agencies.

State of California, Department of Transportation *1999 to 2000*
Associate Environmental Planner
Duties: Conduct background research and prepare environmental documents for a variety of highway projects. Assess environmental impacts in accordance with the California Environmental Quality Act and the National Environmental Policy Act. Request permits from various state and federal agencies. Request record searches, conduct historic property surveys, write historic property survey reports, and coordinate with other agencies. Work with Project Management teams and other specialists to meet project deadlines.

State of California, Department of Parks and Recreation *1982 to 1999*
Associate State Archeologist
Duties: Inventory of park properties and State lands from the north coast to the southern desert, including prehistoric sites, historic sites and historic buildings. Excavate prehistoric and historic sites within State Parks for both test purposes and data recovery. Design inventory strategies and excavation strategies for projects on State lands and within State Parks. Provide mitigation measures for projects under the California Environmental Quality Act. Work with historians preparing detailed historic structures reports.
Other Duties: Catalogue and analyze archeological collections; write archeological reports; work with maintenance staff, equipment operators, construction crews, managers, rangers, historians, architects, engineers, personnel staff, accounting staff, convict crews, and the general public; supervise seasonal employees and volunteers; work in both state (California Environmental Quality Act) and federal (National Historic Preservation Act) regulatory contexts and provide advice on the Archeological

Resource Protection Act, the Native American Graves Protection and Repatriation Act, National Environmental Protection Act, and State Burial Laws; write programmatic agreements and memorandum of agreements under Section 106 of the National Historic Preservation Act; work with Federal agencies, private contractors, and local agencies; and develop public outreach and educational materials.

Sacramento Archeological Society *1994 to 2002*
Member of Board of Directors
Planned activities of board and society as Director of Board for two and one half years. Worked with board members to ensure smooth and efficient operation of the Society. Worked with professional archeologists in providing educational and practical experience for the interested public. Assisted in fund raising and public outreach activities for the Society. Coordinated with other interested groups and agencies to enhance the Society's activities.

California Institute for Peruvian Studies *1986 to 1987*
Travel Coordinator and archeological crew chief
Advanced planning for filed trips to Peru, escorted volunteers while in Lima, Peru, and while continuing their trip until arrival in Acari, Peru. Supervised field crews and coordinated recording and detailed mapping of Nazca period structural remains and other sites in Acari Valley.

Additional Experience *1972 to 1982*
Eastern Washington University, U.S. Forest Service (Ochoco National Forest), National Park Service (Petroleum Reserve #4, Alaska; Fort Vancouver National Monument, Vancouver, WA), Archaeological Associates - Northwest, Archaeological Resources Consulting, California State Parks, Oregon Archaeological Society

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Professional Societies
Society for California Archeology
Society for Historical Archeology
Society for American Archeology
California Council for the Promotion of History

DECLARATION OF
DONNA STONE

I, Donna Stone declare as follows:

1. I am presently employed by the California Energy Commission in the Compliance Office of the Energy Facilities Siting and Environmental Protection Division as a Compliance Project Manager.

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 General Compliance, for the Roseville 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 10, 2004 Signed: Donna C. Stone

At: Sacramento, California

DONNA STONE

Planner II

EXPERIENCE SUMMARY

Donna Stone has sixteen years of experience in electric power regulation and planning. She has worked in the Compliance Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection division since January 2001, overseeing construction and operation activities of energy facilities. Prior to that Donna worked in the Commission's Electricity Analysis Office providing lead analysis and planning activities for both Los Angeles Department of Water and Powers' Planning Area and Southern California Edison's Planning territory, including modeling support. Prior to working in the Electricity Analysis Office of the Commission, Donna worked for the California Department of Water Resources' Energy Division for six years performing a variety of analytical and research-oriented assignments related to the Department's Electric Planning System and hydroelectric project development..

EXPERIENCE

January 2001 To Present — California Energy Commission, Energy Facilities Siting and Environmental Protection Division

Compliance Project Manager – Provide oversight of energy facility construction and operation activities to ensure compliance with conditions of certification. Function as a team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

May 1992 - January 2001 — California Energy Commission, Energy Information and Analysis Division

Planner and Electricity Specialist – Performed a variety of research-oriented assignments. Wrote regulations, database coordination. Prepared written and oral testimony. Lead electricity planner for Southern California Edison and Los Angeles Department of Water and Power Planning Areas. Main responsibilities included following pertinent industry and utility issues, forecasting, energy pricing, shortage contingency planning, cost-benefit analysis, generation system modeling and analysis. Team Leader on data adequacy review, utility supply option characteristics, long-term avoided DSM cost work, 25% rate reduction and unbundled rate work for Edison.. Authored portions of various reports.

September 1986 - May 1992 — California Department of Water Resources, Energy Division

Energy Resource Specialist – Performed a variety of analytical and research oriented assignments related to the Department's Electric Planning System and hydroelectric project development. Interpreted regulations and prepared documents necessary for permit and license approvals of hydroelectric facilities. Analyzed impacts to the Department of regulatory changes in licensing, relicensing, and hydroelectric development. Monitored electrical utility industry regulatory and planning activities of various regulatory agencies. Assisted in conducting technical and economic studies related to development of the State Water Project facilities. Prepared regional resource evaluations and assisted in the preparation of the Department's Resource Plan. Prepared written and oral testimony.

DECLARATION OF

EllieTownsend-Hough

I, Elllie Townsend-Hough declare as follows:

I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as an Associate Mechanical Engineer.

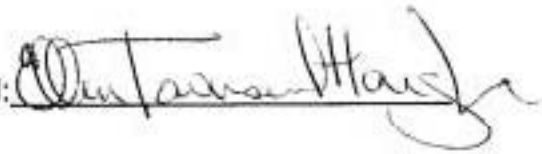
A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on Waste Management for the Roseville Energy Park project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue 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: 11/15/04 Signed: 

At: Sacramento, California

Ellen Townsend-Hough

SUMMARY

I am a chemical engineer with over 20 years of experience. My professional career has afforded me many unique growth and development opportunities. Working knowledge of the California Environmental Quality Act. Strength in analyzing and performing complex engineering analyses. Also worked as a policy advisor to a decision-maker for three years.

PROFESSIONAL EXPERIENCE

Writing

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

EMPLOYMENT HISTORY

2002-Present	Associate Mechanical Engineer	CEC Sacramento CA
1999-2002	Advisor to Commissioner	CEC Sacramento CA
1989-1999	Associate Mechanical Engineer	CEC Sacramento CA
1992-1993	Managing Partner	EnvironNet Sacramento CA
1988-1989	Sales Engineering Representative	Honeywell Inc Commerce CA
1987-1988	Chemical Engineer	Groundwater Technology Torrance CA
1985-1986	Technical Marketing Engineer	Personal Computer Engineers Los Angeles CA
1985-1985	Energy Systems Engineer	Southern California Gas Company Anaheim CA
1980-1985	Design and Cogeneration Engineer	Southern California Edison Rosemead CA
1975-1980	Student Chemical Engineer	Gulf Oil Company Pittsburgh PA

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer

References furnished upon request.

ATTACHMENT A

ROSEVILLE ENERGY PARK
COOLING TOWER PLUME GROUND LEVEL FOGGING ANALYSIS

Testimony of William Walters

INTRODUCTION

The following provides the assessment of the Roseville Energy Park (REP) cooling tower plume ground level fogging. Staff completed a modeling analysis for the applicant's proposed unabated cooling tower design.

PROJECT DESCRIPTION

The applicant has proposed a 4-cell mechanical-draft cooling tower. The Applicant has not proposed to use any methods to abate visible plumes from the cooling towers. The applicant has proposed two different potential turbine configurations (Alstom GTX100 or GE LM6000 turbines), and the cooling tower operation is slightly different for each of these two turbine configurations; therefore, both turbine configurations were modeled.

A project workshop was held September 8th, 2004, to discuss the ground fogging analysis and the applicant provided a separate ground fogging modeling analysis. Based on this workshop and modeling analysis staff adjusted its modeling analysis to correct minor errors in the modeling input files.

COOLING TOWER PLUME GROUND LEVEL FOGGING ANALYSIS

The project site is located adjacent to Phillip Road. Other roads are proposed to be built near the proposed power plant site as part of the West Roseville Specific Plan, including an extension of Blue Oaks Boulevard and West Side Drive. Including the roads specified in the West Roseville Specific Plan, the following major roads are located within 4,000 feet (1,200 meters) of the cooling tower on the project site:

- Blue Oaks Boulevard to the west northwest (WNW) through to the east (E).
- Phillip Road to the east (E) through the south southeast (SSE), and to the west northwest (WNW).
- West Side Drive to the south southwest (SSW) through the west northwest (WNW).
- Hayden Parkway to the northeast (NE) through the southeast (SE).

Several residential and commercial areas, as well as a high school site, as specified in the West Roseville Specific Plan, are also located within 4,000 feet (1,200 meters) of the project site.

The SACTI modeling analysis was performed using two local meteorological data sets: 1990 through 1993 data from Sacramento Airport, and 1992 through 1996 data from McClellan Air Force Base. The results of the modeling analysis are provided in **Table 1**, and the directions and extent of predicted ground fogging is shown visually in **Figure 3** of the **Traffic and Transportation** Section of the **FSA**.

Table 1 – SACTI Estimated Hours of Plume Fogging

Direction to Impact Location	Approximate* Distance feet (m)	SAC Airport Met Data (four years)			
		GTX Duct Firing	GTX No Duct Firing	LM6000 Duct Firing	LM6000 No Duct Firing
NNW to Blue Oaks Blvd	970 (295)	6	**6.1**	7.2	4
NW to Blue Oaks Blvd	1,395 (425)	4.1	**3**	4.5	2.5
WNW to West Side Drive	1,690 (515)	2	**0**	2	0
WNW to Phillip Road	2,360 (720)	2	**0**	2	0
ENE to Phillip Road	520 (160)	0.8	0	0	0
ESE to Philip Road	745 (225)	0	0	0.3	0
SE to Phillip Road	1,605 (490)	1	1	1.1	1
SE to Future HS Grounds	2,575 (785)	1	1	1	1
Direction to Impact Location	**Approximate* Distance feet (m)**	**McClellan AFB Met Data (five years)**			
		GTX Duct Firing	**GTX No Duct Firing**	**LM6000 Duct Firing**	**LM6000 No Duct Firing**
NNW to Blue Oaks Blvd	970 (295)	76.5	66.5	88	50.3
NW to Blue Oaks Blvd	1,395 (425)	24.4	0.7	21.2	0.5
WNW to West Side Drive	1,690 (515)	0	0	0	0
WNW to Phillip Road	2,360 (720)	0	0	0	0
ENE to Phillip Road	520 (160)	0	0	0	0
ESE to Philip Road	745 (225)	0.2	0	0.2	0
SE to Phillip Road	1,605 (490)	0.5	0.5	0.5	0.5
SE to Future HS Grounds	2,575 (785)	0.5	0.5	0.5	0.5

Bold indicates that the values were augmented using the alternate heat rejection/flow margined case data for one SACTI case that would not run due to a high air flow rate estimate. Primary results are for the "non-margined" cooling tower exhaust data provided by the applicant (CH2MHILL 2004a).
When necessary, values are linearly interpolated from the SACTI result data.
*Cooling tower (CT) distances were estimated from Figure 2.2-2 (ROSEVILLE 2003a) and the West Roseville Specific Plan Land Use Plan map (City of Roseville, 2003), and are from the center of the cooling tower.

The SACTI modeling analysis indicates that during the four or five year periods modeled ground fogging may reach all of the major roads, within 4,000 feet (1,200 meters), of the project except for Hayden Parkway. The modeling results indicate that Blue Oaks Blvd., to the NW and NNW of the site, would experience ground fogging much more often that the other nearby proposed major roadways; as much as an average of 10 to 15 hours per year, factoring likely operating schedules and offline periods. The 10 to 15 hours per year average is based on the McClellan AFB meteorological data results for the worst case location on the proposed Blue Oaks Blvd. extension which indicates 10 to 13 hours per year of ground fog without duct firing (50.3 hours/5 years for the LM6000 configuration and 66.5 hour/5 years for the GTX100 configuration) and 15 to 18 hours per year of ground fog with duct firing (76.5 hours/5 years for the GTX100 configuration and 88 hour/5 years for the LM6000 configuration).

Full load operation with duct firing was found to represent the worst-case for estimating ground level fogging. The maximum extent of ground level fogging predicted by SACTI

is approximately 4,000 feet (1,200 meters) to the northwest and southeast of the center of the proposed cooling tower location. The SACTI modeling results for the "safety margined" heat rate and air flow were essentially the same as the non-margined modeling results, so they have not been presented separately. **Figure 3** of the **Traffic and Transportation** Section of the **FSA** shows the extent of the ground fogging predicted by SACTI for the operating cases listed above in **Table 1**, but does not present the frequency potential and is not meant to be used to determine the magnitude of the impacts. Certain wind directions with long ground fogging plume intervals, as shown on **Figure 3**, such as to the Southeast have low predicted frequencies of occurrence.

The results from the model runs using the McClellan meteorological data indicate a much higher incidence of ground fogging than that shown by the Sacramento Airport meteorological data model runs. Model results using both meteorological data sets indicate some potential for fogging to occur at Phillips Road to the SE of the site (and to the future high school grounds to the SE of the site that may impact the unnamed cul-de-sac on the north side of the high school site). The Sacramento Airport met data modeling results also shows some potential for ground fogging to occur at West Side Drive and Phillip Road to the WNW of the site, and at Phillip Road to the ENE and ESE of the site. In general, it is likely that the farther from the site where ground fogging is predicted the less likely it will be that the ground fog will be completely opaque or persistent, so the most significant impacts to ground level visibility are likely to occur closer to the site rather than at the farthest extent that the ground level fogging is predicted.

Staff believes it is prudent to use the McClellan meteorological data modeling results when determining ground fogging potential for the following reasons: 1) the results provide a more conservative basis to determine the potential for traffic safety impacts; and 2) the McClellan meteorological data is from a source that is closer to the site and further east; therefore, it should present wind directions that more closely estimate those that occur at the site.

The modeling results do not specifically indicate that ground fogging will impact any of the residential areas shown in the West Roseville Specific Plan Land Use Plan (City of Roseville 2003). However, given the range of potential meteorological conditions, it may be supposed that there is some potential for ground fogging to occur anywhere within 4,000 feet (1,200) meters from the cooling tower. There are several residential areas located within about 4,000 feet (1,200 meters) from the site, including areas to the NE, to the E and ESE, and to the SSW through W. The most likely residential areas to be impacted are those close to areas with ground fogging predicted (i.e. to the ESE and W). Also, there are two community commercial areas, a fire station, several parks and open space areas, and light and general industrial areas proposed to be built within 4,000 feet (1,200 meters) of the cooling tower.

Ground fogging may occur near the existing wastewater treatment plant (WWTP); however, the conditions that are likely to cause persistent ground level fogging from the WWTP would likely include nearly calm wind conditions. Cooling tower ground fogging would occur when there is enough wind to keep the plume low and initiate downwash

from the cooling tower structure. Therefore, it is not considered likely the cooling tower and WWTP plumes will overlap. Therefore, in terms of cumulative ground fogging impacts, the project is likely to create additional hours of ground fogging impact rather than to create a combined impact with the WWTP ground fog plumes.

The modeling results indicate that the ground fogging from the project would predominately occur in the winter when larger denser cooling tower plumes would occur. More than 90% of the ground fogging plumes were typically predicted by SACTI to occur from November through April.

The modeling assumes full load conditions (duct firing and non-duct firing). It is possible that other part load or duct firing part load operating conditions may change the magnitude or direction of ground fogging. Additionally, SACTI can only include downwash from the cooling tower structure; the other nearby structures of the power plant would likely influence the plume downwash potential (particularly to the West and East). Finally, since SACTI groups meteorological data into a few representative categories it may underestimate the potential for ground fogging in all directions under all of the meteorological conditions that could occur during the life of the proposed project.

APPLICANT MODELING ANALYSIS

The applicant provided ground fogging plume modeling files, but did not present a written summary of the results or explanation of the modeling input assumptions. The applicant's modeling analysis only included the modeling of an average annual heat rate (114.7 MW), with all four cells in operation, using Sacramento Airport meteorological data (1990-1993). This analysis assumed a slightly different cooling tower angle (25 vs. 22 degrees east of north) and cell separation, and assumed a different tower housing size than assumed by staff. The applicant did not provide any rationale why these values were changed. The applicant's modeling analysis used separately processed Sacramento Airport data, which caused the hourly meteorological data to be moved be shifted an hour. This is not a major error but is a consistent result when the PCRAMMET processor is used without appropriate pre-processing for conversion to the CD144 format required by SACTI. The overall modeling results indicate ground fogging frequencies at Blue Oaks that are higher than staff's predicted impacts based on the Sacramento Airport meteorological data modeling runs.

The applicant's ground fogging modeling analysis is flawed primarily due to the average heat rejection approach. Ground fogging impacts are short-term events, so the use of annual average heat rates, without consideration to the number of cells in operation and the worst-case short-term heat rates, will not provide for a properly conservative analysis. For comparison, it would not be appropriate to use annual average NO_x emissions to model worst-case 1-hour impacts. Additionally, the applicant's analysis did not incorporate the McClellan meteorological data. Staff modeled each of the operating cases as presented by the applicant, with two local meteorological files to provide for a more thorough and conservative analysis.

Staff's overall conclusion is that the applicant's modeling analysis is seriously flawed and provides no new relevant information, and that staff's more thorough analysis provides a better basis to determine the potential for traffic impacts from ground fogging events.

IMPACT MITIGATION OPTIONS

The cooling tower plumes, including ground fogging plumes, can be mitigated by the use of a plume abated cooling tower or dry cooling. The likelihood of ground fogging plumes reaching roadways surrounding the site would be negligible, if not completely eliminated, with a well designed and operated plume abated cooling tower, and would be completely eliminated with dry cooling.

Additional description of the design considerations and cost of a plume abated cooling tower are presented in the Visual Resources section of the FSA. Due to its cost, both capital and operating cost, dry cooling is not considered a feasible mitigation option for this project.

CONCLUSIONS

Based on staff modeling of ground level fogging for the Roseville Energy Park Project, occasional ground fogging events would likely occur on several roadways surrounding the site including the potential for fairly frequent (several hours per month) winter ground fogging events on Blue Oaks Blvd to the northwest or north northwest of the project site. Cooling tower plume abatement, in the form of a wet/dry plume abated cooling tower, would mitigate the ground fogging plumes.

It should be noted that the cooling tower impacts analyses are based on the cooling tower design information provided by the Applicant. If the cooling tower design or operating principles change then this analysis would be need to be updated to determine the effect on plume frequency, plume dimensions, and ground level fogging.

REFERENCES

City of Roseville, 2003. Transportation and Circulation Section, Environmental Impact Report for the West Roseville Specific Plan and Sphere of Influence Amendment, dated September 15, 2003.

CH2MHill, Sacramento, California (CH2MHill) 2004a. Applicant's Responses to CEC Staff Data Requests 1 – 71. Submitted to the Docket on February 6, 2004.

Roseville Electric, Roseville, California (ROSEVILLE) 2003a. Application for Certification Volumes I & II. Submitted to the Docket on October 30, 2003.

Appendix A
Roseville vs. Campbell's Soup Cooling Tower
Ground Fogging Modeling Results

Roseville CT - SACTI Ground Fogging Results – Sacramento Airport Met Data

HOURS OF PLUME FOGGING TABLE

"ROSEVILLE GTX100 DUCT FIRING -- COOLING TOWER ANALYSIS ALL (Sacto 1990-1993)"

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM PLUME HEADED N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL SUM
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	
10.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
30.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
40.	.1	.0	.0	.0	.5	2.9	3.7	.8	.0	.0	.0	.0	.0	.5	1.4	1.1	11.1
50.	1.6	.0	.0	.0	2.0	8.9	14.0	10.1	3.0	1.0	.0	.0	.0	1.0	2.6	2.0	46.1
60.	1.5	.1	.0	.0	2.3	9.3	13.3	14.4	2.1	1.3	.1	.1	.0	1.0	2.5	2.1	50.0
70.	1.3	.3	.0	.0	2.3	9.3	13.3	25.1	2.3	1.5	.3	1.0	.0	1.0	2.3	2.3	61.9
80.	1.1	.0	.0	.0	2.3	9.3	13.3	26.3	2.0	1.0	.0	1.0	.0	1.0	2.1	2.0	61.2
90.	1.0	.0	.0	.0	1.7	7.6	12.7	24.6	2.0	1.0	.0	1.0	.0	1.0	2.0	2.0	56.7
100.	.9	.0	.0	.0	1.0	6.5	12.0	23.5	1.7	.9	.0	1.0	.0	.9	2.0	1.9	52.2
125.	.4	.0	.0	.0	1.0	6.1	10.1	23.5	.7	.4	.0	1.0	.0	.5	2.0	1.5	47.1
150.	.0	.0	.0	.0	1.0	5.6	7.6	22.0	.0	.0	.0	1.0	.0	.5	2.0	1.5	41.2
175.	.0	.0	.0	.0	1.0	5.5	7.0	18.0	.0	.0	.0	.6	.0	.5	2.0	1.5	36.1
200.	.0	.0	.0	.0	.2	4.4	6.2	16.9	.0	.0	.0	.5	.0	.1	2.0	1.1	31.4
250.	.0	.0	.0	.0	.0	4.0	6.0	10.4	.0	.0	.0	.2	.0	.0	2.0	.6	23.2
300.	.0	.0	.0	.0	.0	4.0	6.0	5.5	.0	.0	.0	.0	.0	.0	2.0	.5	18.0
350.	.0	.0	.0	.0	.0	4.0	6.0	5.5	.0	.0	.0	.0	.0	.0	2.0	.5	18.0
400.	.0	.0	.0	.0	.0	3.5	5.2	4.7	.0	.0	.0	.0	.0	.0	1.0	.5	14.9
450.	.0	.0	.0	.0	.0	2.0	3.0	4.0	.0	.0	.0	.0	.0	.0	1.0	.5	10.5
500.	.0	.0	.0	.0	.0	2.0	3.0	4.0	.0	.0	.0	.0	.0	.0	1.0	.5	10.5
600.	.0	.0	.0	.0	.0	2.0	3.0	4.0	.0	.0	.0	.0	.0	.0	1.0	.5	10.5
700.	.0	.0	.0	.0	.0	2.0	3.0	4.0	.0	.0	.0	.0	.0	.0	1.0	.1	10.1
800.	.0	.0	.0	.0	.0	2.0	3.0	4.0	.0	.0	.0	.0	.0	.0	1.0	.0	10.0
900.	.0	.0	.0	.0	.0	2.0	3.0	3.0	.0	.0	.0	.0	.0	.0	1.0	.0	9.0
1000.	.0	.0	.0	.0	.0	2.0	3.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	6.0
1100.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.7
1200.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Campbell's CT - SACTI Ground Fogging Results – Sacramento Airport Met Data

HOURS OF PLUME FOGGING TABLE

"CAMPBELL CT (SAC 1990-1993)"

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM PLUME HEADED N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL SUM
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	
10.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
30.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
40.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
50.	1.0	.0	.0	.0	.0	4.0	6.0	8.0	2.0	.0	.0	.0	.0	.0	2.0	1.0	24.0
60.	.6	.0	.0	.0	.0	2.5	3.7	4.9	1.2	.9	1.5	.8	.0	.0	2.0	1.0	19.1
70.	.5	.0	.0	.0	.0	2.0	3.0	4.0	1.0	1.0	2.0	1.0	.0	.0	2.0	1.0	17.5
80.	.2	.0	.0	.0	.0	2.0	3.0	4.0	.5	1.0	2.0	1.0	.0	.0	1.7	.9	16.3
90.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	2.0	1.0	.0	.0	1.0	.5	5.5
100.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	2.0	1.0	.0	.0	.2	.1	4.4
125.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	1.2	.6	.0	.0	.0	.0	2.8
150.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.5	.2	.0	.0	.0	.0	1.7
175.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
200.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
250.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
300.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.7
350.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
400.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
450.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
500.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
600.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
700.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
800.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.4
900.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1000.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1100.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1200.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Roseville CT - SACTI Ground Fogging Results – McClellan AFB Met Data

HOURS OF PLUME FOGGING TABLE

"ROSEVILLE GTX100 DUCT FIRING -- COOLING TOWER ANALYSIS ALL (MC 1992-1996)"

SEASON=ANNUAL

WIND FROM

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	PLUME HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
10.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
30.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
40.	.0	.0	.0	.0	.3	7.6	26.2	6.5	.0	.0	.0	.0	.0	.2	.8	.2	41.7
50.	.2	.0	.0	.0	.9	24.9	48.9	61.4	5.5	.5	.0	.0	.0	.5	1.2	1.5	145.4
60.	.2	.0	.0	.0	.7	23.4	48.7	112.3	9.8	2.3	.1	.0	.0	.5	1.2	1.5	200.9
70.	.0	.0	.0	.0	.5	21.0	48.5	217.0	11.0	1.0	.0	.0	.0	.5	1.0	1.5	302.0
80.	.0	.0	.0	.0	.0	16.0	48.0	212.0	11.0	1.0	.0	.0	.0	.5	1.0	1.5	291.0
90.	.0	.0	.0	.0	.0	15.7	45.4	212.0	8.2	.7	.0	.0	.0	.5	1.0	1.5	285.0
100.	.0	.0	.0	.0	.0	15.0	38.0	212.0	5.5	.5	.0	.0	.0	.5	1.0	1.5	274.0
125.	.0	.0	.0	.0	.0	7.2	28.0	194.2	1.3	.1	.0	.0	.0	.4	1.0	1.4	233.6
150.	.0	.0	.0	.0	.0	7.0	28.0	158.0	.0	.0	.0	.0	.0	.3	1.0	1.3	195.5
175.	.0	.0	.0	.0	.0	7.0	28.0	125.0	.0	.0	.0	.0	.0	.3	1.0	1.3	162.5
200.	.0	.0	.0	.0	.0	5.2	28.0	105.2	.0	.0	.0	.0	.0	.3	1.0	1.3	141.0
250.	.0	.0	.0	.0	.0	.1	28.0	100.1	.0	.0	.0	.0	.0	.1	1.0	1.1	130.2
300.	.0	.0	.0	.0	.0	.0	28.0	73.9	.0	.0	.0	.0	.0	.0	1.0	.5	103.4
350.	.0	.0	.0	.0	.0	.0	28.0	50.0	.0	.0	.0	.0	.0	.0	1.0	.5	79.5
400.	.0	.0	.0	.0	.0	.0	28.0	50.0	.0	.0	.0	.0	.0	.0	1.0	.5	79.5
450.	.0	.0	.0	.0	.0	.0	20.7	50.0	.0	.0	.0	.0	.0	.0	.6	.5	71.8
500.	.0	.0	.0	.0	.0	.0	14.0	50.0	.0	.0	.0	.0	.0	.0	.5	.5	65.0
600.	.0	.0	.0	.0	.0	.0	14.0	50.0	.0	.0	.0	.0	.0	.0	.5	.5	65.0
700.	.0	.0	.0	.0	.0	.0	14.0	50.0	.0	.0	.0	.0	.0	.0	.5	.5	65.0
800.	.0	.0	.0	.0	.0	.0	14.0	50.0	.0	.0	.0	.0	.0	.0	.5	.1	64.6
900.	.0	.0	.0	.0	.0	.0	14.0	24.3	.0	.0	.0	.0	.0	.0	.5	.0	38.8
1000.	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.5	.0	1.0
1100.	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.5	.0	1.0
1200.	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.4	.0	.7

Campbell's CT - SACTI Ground Fogging Results – McClellan AFB Met Data

HOURS OF PLUME FOGGING TABLE

"CAMPBELL CT (McClellan 1992-1996)"

SEASON=ANNUAL

WIND FROM

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	PLUME HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
10.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
30.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
40.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
50.	.0	.0	.0	.0	.0	.0	28.0	100.0	11.0	.0	.0	.0	.0	.0	1.0	1.0	141.0
60.	.0	.0	.0	.0	.0	.0	17.6	61.7	6.8	.9	.0	.0	.0	.0	1.0	1.0	89.0
70.	.0	.0	.0	.0	.0	.0	14.5	50.0	5.5	1.0	.0	.0	.0	.0	1.0	1.0	73.0
80.	.0	.0	.0	.0	.0	.0	14.4	50.0	2.7	1.0	.0	.0	.0	.0	.9	.9	69.8
90.	.0	.0	.0	.0	.0	.0	.5	.0	.0	1.0	.0	.0	.0	.0	.5	.5	2.5
100.	.0	.0	.0	.0	.0	.0	.1	.0	.0	1.0	.0	.0	.0	.0	.1	.1	1.4
125.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
150.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
175.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
200.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
250.	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	1.0
300.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.7
350.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
400.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
450.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
500.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
600.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
700.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.5
800.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.4
900.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1000.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1100.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1200.	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0