Staff Assessment

LODI ENERGY CENTER

Application For Certification (08-AFC-10)
San Joaquin County

CALIFORNIA ENERGY COMMISSION

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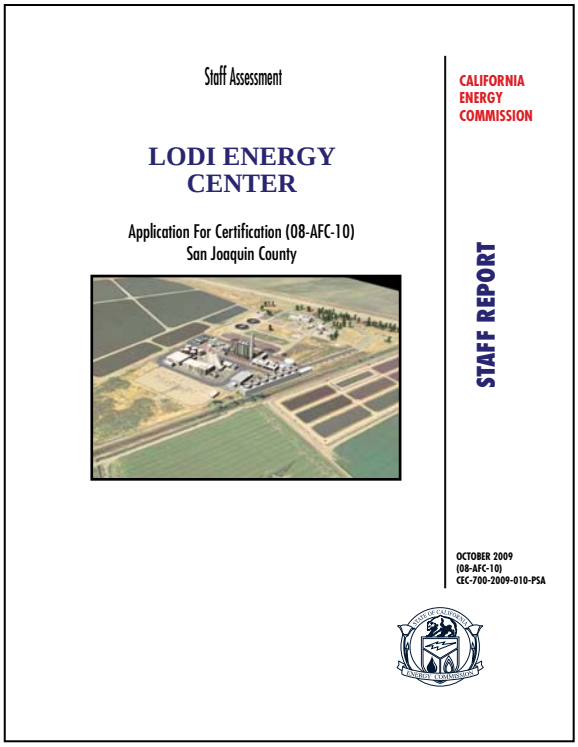

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LODI ENERGY CENTER PROJECT
(08-AFC-10)
STAFF ASSESSMENT

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INTRODUCTION

This Staff Assessment (SA) contains the California Energy Commission staff's independent evaluation of the Lodi Energy Center Power Plant Project (LEC) Application for Certification (08-AFC-10). The SA examines engineering, environmental, public health and safety aspects of the LEC project, based on the information provided by the applicant, the Northern California Power Agency, and other sources available at the time the SA was prepared. The SA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

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

The SA will serve as staff's testimony in evidentiary hearings to be held by a 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, government agencies, all parties and the public prior to proposing its decision. The Energy Commission will make findings and provide a final decision after the Committee's publication and consideration of comments on its Presiding Member's Proposed Decision.

The analyses contained in this SA are based upon information from: 1) the Application for Certification; 2) subsequent amendments; 3) workshops and site visits; 4) responses to data requests; 5) additional information from federal, state and local agencies; 6) existing documents and publications; 7) independent research; and 8) public comments.

PROJECT LOCATION AND DESCRIPTION

The proposed site for the LEC project is 4.4 acres of land owned and incorporated by the city of Lodi, 6 miles west of the Lodi city center, located near Interstate-5 (I-5) approximately 1.7 miles south of State Route 12**.** On the east side of the site is the city of Lodi's White Slough Water Pollution Control Facility (WPCF). The WPCF's treatment and holding ponds are located to the north of an existing generating plant, the 49-megawatt (MW) Northern California Power Agency (NCPA) Combustion Turbine Project (CTP #2), is located to the west with a 230-kilovolt (kV) Pacific Gas and Electric overhead electrical transmission line aligned further to the west, and the San Joaquin

County Mosquito and Vector Control facility is to the south. The proposed project would also be located near the city of Stockton, which is approximately 2 miles south. The project site is currently undeveloped and used for equipment storage during upgrades to the WPCF**.**

Construction of the proposed LEC facility would require the use of four parcels totaling 9.8 acres, and designated as construction and lay down areas. Project Description **Figures 2 & 3 show the site location, the proposed laydown and parking areas** which would encompass the existing site boundaries of the city of Lodi's White Slough Water Pollution Control Facility. During construction the four parcels would be separated by area: Area A (3.1 acres), Area B (2.2 acres), Area C (1.6 acres) and Area D (2.9 acres).

Lands nearest the project site are primarily agricultural and rural residential. No agricultural production would be displaced by the project. There are three residences located approximately 0.75 mile Road to the north of the project site; and a housing development along Eight Mile road is located about two miles south of the site. There are no sensitive receptors nearby. The proposed project site including construction laydown and parking areas and a portion of the proposed natural gas pipeline route are zoned Public and Community Facilities. The realigned portion of the proposed natural gas pipeline would be on lands designated as Unique Farmland by the Farmland Mapping and Monitoring Program of the California Department of Conservation and located on lands designated by the San Joaquin County General Plan as General Agriculture.

The applicant, NCPA, proposes to construct and operate the LEC, a natural gas-fired, combined-cycle nominal 296 megawatt power generation facility in the city of Lodi, San Joaquin County, California. The LEC project would consist of the following components: (1) One natural gas-fired Siemens STG6-5000F combustion turbine-generator (CTG), with an evaporative cooling system and dry low-Nox(nitrogen oxide) combustors to control air emissions; (2) one 3-pressure heat recovery steam generator (HRSG), (3) a selective catalytic reduction (SCR) and carbon monoxide (CO) catalyst to further control NO_x and CO emissions, respectively; (4) one Siemens SST-900RH condensing steam turbine generator (STG); (5) one natural gas-fired auxiliary boiler; (6) one 7-cell draft evaporative cooling tower; and (7) associated support equipment (CH2MHILL 2009c sections 2.0, 2.1.421.6.1).

The LEC will be designed to use "Flex Plant 30" rapid startup technology, which is designed to allow earlier startup of the steam turbine by decoupling the gas turbine from the HRSG, essentially reducing startup emissions…The CTG and associated equipment will include the use of best available control technology (BACT) to limit emissions of criteria pollutants and hazardous air pollutants. An SCR system using ammonia injection will help control NO_x and volatile organic compounds. BACT for PM_{10} (particulate matter less than 10 microns in size) and SO_2 (sulfur oxide) will be the exclusive use of natural gas, and ammonia would also be limited to 10 parts per million (NCPA, 2000a). The proposed LEC facility's output would be transmitted to the power grid via a proposed 520-foot line connecting to the existing CTP #2's 230 kV switchyard adjacent to the plant.

Natural gas would be delivered to the project through a new off-site pipeline (about 2.7 miles long, based on a revised route) running parallel to the 3-mile existing natural gas pipeline (#108) owned by Pacific Gas and Electric that services the existing CTP # 2 plant, adjacent to the project site. A portion of the pipeline (about 1.1 miles) has been revised between N. Thornton Road and N. Devries Road, and will increase the linear corridor by approximately 1,274 feet (0.24 mile). The route change is considered minor and not expected to have a significant impact on the overall project. Please note that Figure 2 in this document shows the revised gas supply pipeline route. Recycled water would be used for cooling needs for the LEC project and would be provided by a 48 inch-diameter pipeline in the utility corridor connecting the LEC and city of Lodi's WPCF. Potable water for sanitary and domestic use would be provided by a new on-site potable water well.

PUBLIC AND AGENCY COORDINATION

On September 22, 2008, the Energy Commission staff sent notification letters, copies of the AFC and Supplement, for the LEC to a comprehensive list of libraries and public agencies. A Notice of Receipt letter was also sent to businesses organizations and residences located within 1,000 feet of the proposed project and 500 feet of the linear facilities. The Energy Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On January 15, 2009, an Information Hearing and a Site Visit for the LEC project were conducted at the Hutchins Street Square in the city of Lodi. On February 23, 2009, staff conducted a publicly noticed Data Response and Issue Resolution workshop in the city of Lodi and discussed the topics of air quality, cultural resources, land use, visual resources, and soils and water resources. Participating agencies in the workshop included the applicant and the city of Lodi. In addition to this workshop, coordination has also occurred with numerous other local, state and federal agencies that have an interest in the project including the city of Lodi, San Joaquin County of Governments (SCOG), San Joaquin Valley Air Pollution Control District, California Department of Toxic Substances Control, California Department of Transportation, District 10, and U.S. Fish and Wildlife Service (USFWS). There are currently no interveners in the LEC's AFC process.

ENVIRONMENTAL JUSTICE

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

11 areas, staff considered potential impacts and mitigation measures, significance, and whether there would be a disproportionate impact on an environmental justice population.

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

- The minority population of the affected area is greater than 50% 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.

For the LEC, the total population within a six-mile radius of the proposed site is 77, 305 persons, and the total minority population is 33, 496 persons or 43.3% of the total population (see **SOCIOECONOMICS Figure 1**). While the demographic screening area as a whole does not exceed 50.0%, as shown in **SOCIOECONOMICS Figure 1**), several census blocks within the six-mile radius of the proposed site contain a minority population greater than 50%.

Staff has also identified the current below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. The total population within a six-mile radius of the proposed site evaluated for low-income populations is 79,197 persons, and the total low-income population is 10,216 persons or 12.9% of the total population.

ENVIRONMENTAL JUSTICE CONCLUSIONS

Energy Commission staff concluded that the construction and operations of the LEC would not result in significant adverse direct, or indirect environmental impacts to any low-income, or minority populations. In addition, the LEC would not contribute to a cumulative adverse environmental impact on any low-income or minority populations.

STAFF'S ASSESSMENT

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

- The environmental setting of the proposal;
- Impacts on public health and safety, and measures proposed to mitigate these impacts;
- Environmental impacts, and measures proposed to mitigate these impacts;

- The engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- Project closure;
- Project alternatives;
- Compliance of the project with all applicable laws, ordinances, regulations and standards (lors) during construction and operation;
- Environmental justice for minority and low income populations;
- Proposed conditions of certification; and
- Recommendation on project approval or denial.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the LEC project would comply with all applicable laws, ordinances, regulations, and standards (LORS). Staff's preliminary conclusions are that significant adverse direct, indirect or cumulative impacts are not likely to occur in any of the technical areas, although two technical areas (biological and cultural resources) are currently undetermined with respect to mitigation of potential impacts. For a more detailed review of potential impacts, see staff's technical analyses in the SA. The status of each technical area is summarized in the table below.

The discussion following the table identifies the technical areas in the SA that staff has identified as having outstanding issues which in order to resolve require either additional data, further discussion and analysis or are awaiting conditions from a permitting agency prescribing mitigation.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes*
Biological Resources	Yes	**Undetermined**
Cultural Resources	Yes	**Undetermined**
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

*Staff finds that mitigation would be provided in the form of emission reduction credits (ERCs) as required by the San Joaquin Valley Air Pollution Control District rules, to fully offset all nonattainment pollutants and their precursors at a minimum ratio of one-to-one, and to reduce the potential impacts of the proposed project to less than significant.

BIOLOGICAL RESOUCES

The LEC would potentially impact numerous special-status wildlife species: Burrowing owl, Swainson's hawk, white tail kite, western pond turtle, northwestern pond turtle, and giant garter snake (GGS). According to the California Natural Diversity Database (CNDDB), several species were identified to occur in the LEC site and laydown areas, and could be impacted during construction and operation activities. Compliance with the federal and state Endangered Species Acts (ESA), biological resources Conditions of Certification, and other laws, ordinances, regulations, and standards (LORS) discussed in the staff assessment, including measures provided in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) would likely mitigate LEC's impacts to these biological resources.

CULTURAL RESOURCES

Staff identified no known cultural resources that the construction of the proposed LEC project would significantly impact. Staff cannot, however, conclude that the LEC project would have no significant impact on potential Cultural Resources Habitat Recovery (CR-HR)-eligible archaeological resources present on the site, buried deeper than 3 feet below the surface and at this time unidentified. To conclude its analysis of the LEC project's potential impacts on such buried resources, staff needs the following additional information from NCPA, the applicant):

- A detailed description of the extent horizontally and vertically of over-excavation and filling that would be done to raise the entire LEC site above the 100-year flood zone, because the over-excavation could impact unidentified buried archaeological resources and staff needs to know how extensive this impact would be; and
- A detailed description of the extent horizontally and vertically of soil remediation that would be required, because this activity
    - Could impact unidentified buried archaeological resources,
    - Would modify the parameters of the field study that staff proposes in **CUL-1**, and
    - Could present an opportunity for a pre-certification coordinated geoarchaeological field study, perhaps eliminating the need for the post-certification geoarchaeological field study staff is proposing in **CUL-1**.

Staff assumes that NCPA would be able to provide information for incorporation into staff's discussion of potential project impacts in the SA and for use as one factor in staff's specifying the extent of archaeological monitoring required in **CUL-9**.

Staff's proposed **CUL-1** requires that a geoarchaeologist conduct a study of the project site and write a report for submittal to the project owner, to the project Cultural Resources Specialist (CRS), and to the Energy Commission's Compliance Project Manager (CPM). **CUL-2** requires the CRS to be available during the geoarchaeological field work and during the LEC's construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. Under **CUL-3**, the CRS would evaluate the eligibility for the California Register of Historical Resources (CRHR) of any buried archaeological deposits encountered during geoarchaeological field work. Under **CUL-4**, the CRS would conduct data recovery from any buried archaeological deposits encountered during the geoarchaeological field work that the CRS recommended to be eligible for the CRHR.

Staff's proposed **CUL-5** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-6** requires that the CRS write and submit for CPM approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), including the results of the geoarchaeological study, the evaluations of any buried archaeological deposits encountered during the geoarchaeological field work, and data recovery plans for any evaluated archaeological deposits determined CRHR-eligible by

the CPM. **CUL-7** requires the CRS to write and submit to the CPM a final report on all LEC cultural resources monitoring and mitigation activities. **CUL-8** requires the project owner to train workers to recognize cultural resources.

CUL-9 uses the recommendations, as approved by the CPM, of the geoarchaeological study and the results of any data recovery from CRHR-eligible archaeological deposits encountered during geoarchaeological field work, to configure the archaeological monitoring intended to identify buried prehistoric archaeological deposits, prescribing how much monitoring at what locations and depths in the project areas would be most consistent with CEQA requirements for mitigation of impacts through avoidance, when possible, and with the preservation goal of recovering valid scientific data from CRHR-eligible archaeological deposits whose destruction cannot be avoided. A Native American monitor will be included to observe ground disturbance, comment on any discoveries, and represent Native American heritage concerns.

Finally, **CUL-10** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible.

ALTERNATIVES SUMMARY

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

In the analysis of the Lodi Energy Center Project (LEC)), two alternative project sites were examined (East Turner and Ripon, respectively), as well as several alternative energy producing technologies which are comparable to natural gas-fired technology. Lacking a significant environmental impact associated with the proposed project, the alternative sites and generation technologies would not result in an environmentally superior project.

The two alternative sites analyzed are slightly larger than the proposed project in size. Alternative Site 1, on East Turner Road is 10 acres in size, and Alternatives Site 2, the Ripon location, is 9.8 acres. Both alternative sites are located within reasonable proximity to infrastructure connections (i.e., transmission lines, gas lines) though the East Turner location would require a 12-mile water line connection. Neither of the alternative sites are considered to be superior to the applicant’s proposed site.

Alternative generation technologies (i.e., boiler and steam. conventional simple-cycle combustion turbine, Kalina combined cycle, and internal combustion engines) were examined as possible alternatives to the project. The technologies while on par with the LEC project have potential efficiency and dated technology issues.

Staff also believes that the “No Project Alternative” is not superior to the proposed project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability to the affected service area. Therefore, staff does not recommend alternative generation technologies or alternative sites over the technology proposed LEC.

NOTEWORTHY PUBLIC BENEFITS

SOCIOECONOMICS

Important public benefits discussed under the fiscal and non-fiscal effects Application For Certification section are: operation and maintenance, and employment. The annual operations and maintenance budget is expected to be approximately $3.5 million (based on 2008 dollars), of which $2.2 million is likely to be spent locally within San Joaquin County.

During the 24-month construction period, the project would provide at its peak 305 construction jobs. During non-peak times that number is projected to be 168 employees. When completed the LEC facility would permanently employ 5 to 7 new employees and share 21 to 23 employees (16 existing staff from the NCPA CTP#2). It is estimated that 60% of the construction workforce would reside in San Joaquin County, and that approximately $16.08 million would stay in the local area during the construction period.

In addition to the direct employment benefit, the LEC plant will require and use the services of local or regional firms for major maintenance, plant supplies, and other support services throughout the life of the facility.

RECOMMENDATIONS AND SCHEDULE

For a more detailed review of potential impacts, see staff's technical analyses in the SA. Staff has listed the outstanding issues as applicable in the technical sections of the SA. To resolve these issues, staff requires either additional data, further discussion and analysis, or is awaiting information from a permitting agency prescribing mitigation.

Absent any non-compliance with LORS or significant direct or indirect environmental impacts, staff concludes there will not be a disproportionately high and adverse human health or environmental effect on a minority and/or low-income population, and thus, no disproportional impact to an environmental justice population.

In conclusion, based on the information available at this time, staff will work to resolve the outstanding issues and to update our preliminary conclusions. The project is being reviewed under the 12-month AFC process. Staff will conduct a public workshop on the SA within 30 days of its publication with a date to be determined in November 2009.

INTRODUCTION

Rod Jones

PURPOSE OF THIS REPORT

The Staff Assessment (SA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Lodi Energy Center (LEC) Project Application for Certification (AFC). This SA is a staff document. It is neither a Committee document, nor a draft decision. The SA describes the following:

- 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; and
- Project alternatives.

The analyses contained in this SA 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 owner's and Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted conditions of certification.

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 SA 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. For the environmental assessment they include the following: air quality; 2) biological resources; 3) cultural

resources; 4) hazardous materials management; 5) land use; 6) noise and vibration; 7) public health; 8) socioeconomics; 9) soil and water resources; 10) traffic and transportation; 11) transmission line safety and nuisance; 12) visual resources; 13) waste management; and, 14) worker safety/fire protection. For the engineering assessment, technical areas addressed are: 1) facility design; 2) geology and paleontology; 3) power plant efficiency; 4) power plant reliability; and, 5) transmission system engineering. These chapters are followed by a discussion of project alternatives, facility closure, project construction and operation compliance monitoring plans (general conditions), and a list of 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;
- Response to agency and public comments (if applicable);
- 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 is the CEQA lead agency and is subject to all portions of CEQA applicable to certified regulatory activities.

Staff typically prepares both a preliminary and final staff assessment. However, to adhere to agreed upon timelines for this project, staff will prepare a SA only. The SA presents for the Applicant, interveners, agencies, other interested parties, and members of the public, the staff's final analysis, conclusions, and recommendations.

Staff uses the SA to resolve issues between the parties and to narrow the scope of any adjudicated issues in the evidentiary hearings. After publication of the SA, staff will conduct a workshop to discuss its findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshop and written comments, staff will submit final conditions of certification to reflect areas where the parties have reached agreement in a joint stipulation document.

The SA 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 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 SA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. The Energy Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission.

AGENCY COORDINATION

As noted previously, 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, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, and the California Air Resources Board.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by its Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of public outreach, regardless of outreach efforts by interested parties.

LIBRARIES

On September 22, 2008, the Energy Commission staff sent the LEC AFC to libraries in the city of Lodi, Thornton, and Stockton. In addition, documents were also sent to state libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco.

PUBLIC ADVISER'S OFFICE INITIAL OUTREACH EFFORTS

The PAO's public outreach work is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify "sensitive receptors" (including schools, community, cultural and health facilities, daycare and senior-care centers, as well as environmental and ethnic organizations) within a six-mile radius of the proposed sites for the project. These sensitive receptors, especially elementary schools, are conducted and kept informed of Energy Commission proceedings through PAO outreach. The PAO also works with the siting division and the governmental affairs office to identify and contact local elected and appointed officials from the area.

The PAO provided notification by letter and enclosed notice of the January 15, 2009 Informational Hearing and Site Visit, held at the Hutchinson Street Square in Lodi. Energy Commission regulations require staff to notice, at a minimum, property owners and renters within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines), which was done for the LEC project. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the Executive Summary section of the SA.

PROJECT DESCRIPTION

Rod Jones

INTRODUCTION

On September 10, 2008, Northern California Power Agency (NCPA) submitted an Application for Certification (AFC) to the California Energy Commission to construct and operate the Lodi Energy Center Project (LEC), a natural gas-fired, combined-cycle nominal 296-megawatt (MW) power generation facility in the city of Lodi, San Joaquin County, California. On October 24, 2008, NCPA provided an AFC Data Adequacy Supplement B to the AFC to satisfy the Energy Commission's informational requirements. On November 13, 2008, the Energy Commission accepted the AFC with the supplemental information as complete. The determination initiated Energy Commission staff's analysis of the proposed project.

PURPOSE OF PROJECT

The 296 MW capacity of LEC would provide base and peak load and ancillary power services designed to meet the electric generation demand and reliability requirements in the city of Lodi and provide low-cost, non-profit power to NCPA's participating members. NCPA is a not-for-profit joint powers agency that represents and provides support for 17 member communities and districts in northern and central California. NCPA was founded in 1968 as a forum through which community-owned utilities could make investments to ensure an affordable, reliable, and clean future energy supply for electric ratepayers. **Project Description Figure 4** shows an architectural rendering of LEC.

PROJECT LOCATION

The proposed site for the LEC project is 4.4 acres of land owned and incorporated by the city of Lodi, 6 miles west of the Lodi city center, located near Interstate-5 (I-5) approximately 1.7 miles south of State Route 12**.** On the east side of the site is the city of Lodi's White Slough Water Pollution Control Facility (WPCF). The WPCF's treatment and holding ponds are located to the north; an existing generating plant (49-MW NCPA Combustion Turbine Project (CTP #2) is located to the west with a 230-kV Pacific Gas and Electric overhead electrical transmission line aligned further to the west, and the San Joaquin County Mosquito and Vector Control facility is to the south. The proposed project would also be located near the city of Stockton, which is approximately 2 miles south. The project site is currently undeveloped and used for equipment storage during upgrades to the WPCF **(See Figure1, Project Vicinity).**

Construction of the proposed LEC facility would require the use of four parcels totaling 9.8 acres, and designated as construction and lay down areas. **Figures 2 & 3 (Site Location and Proposed Laydown and Parking Areas)** show the parcels locations which would encompass the existing site boundaries of the city of Lodi's WPCF. During construction the four parcels would be separated by area: Area A (3.1 acres), Area B (2.2 acres), Area C (1.6 acres) and Area D (2.9 acres).

Lands nearest the project site are primarily agricultural and rural residential. No agricultural production would be displaced by the project. There are three residences located approximately 0.75 mile to the north of the project site; a housing development along Eight Mile Road is located about two miles south of the site. There are no sensitive receptors nearby. The proposed project site including construction laydown and parking areas and a portion of the proposed natural gas pipeline route are zoned Public and Community Facilities. The realigned portion of the proposed natural gas pipeline would be on lands designated as Unique Farmland by the Farmland Mapping and Monitoring Program of the California Department of Conservation and located on lands designated by the San Joaquin County General Plan as General Agriculture.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The applicant, NCPA, proposes to construct and operate the LEC, a natural gas-fired, combined - cycle nominal 296 MW (net output) power generation plant in the city of Lodi, San Joaquin County, California. The LEC project would consist of the following components: (1) One natural gas-fried Siemens STGS-5000F combustion turbine-generator (CTG), with an evaporative cooling system and dry low-NO_x combustors to control air emissions; (2) one 3-pressure heat recovery steam generator (HRSG), (3) a selective catalytic reduction (SCR) and carbon monoxide (CO) catalyst to further control NO_x and CO emissions, respectively; (4) one Siemens SST-900RH condensing steam turbine generator (STG); (5) one natural gas-fired auxiliary boiler; (6) one 7-cell draft evaporative cooling tower; and (7) associated support equipment (CH2MHILL2009c sections 2.0,2.1.421.6.1).

The LEC will be designed to use “Flex Plant 30” rapid startup technology, which is designed to allow earlier startup of the steam turbine by decoupling the gas turbine from the HRSG; essentially reducing startup emissions. The project is expected to have an overall annual availability of more than 95%. The CTG and associated equipment will include the use of best available control technology (BACT) to limit emissions of criteria pollutants and hazardous air pollutants. An SCR system using ammonia injection will help control NO_x (nitrogen oxide) and volatile organic compounds. BACT for PM_{10} (particulate matter) and SO_2 (sulfur oxide) will be the exclusive use of natural gas, and ammonia would also be limited to 10 part per million (NCPA, 2009 a).

ELECTRIC TRANSMISSION

The proposed LEC facility’s output would be transmitted to the power grid via a proposed 520-foot kilovolt (kV) line through to the existing CTP #2’s 230 kV switchyard substation adjacent to the plant.

NATURAL GAS SUPPLY

Natural gas would be delivered to the project through a new off-site pipeline (about 2.7 miles long, based on revised route) and run parallel to the 3-mile existing natural gas pipeline (#108) owned by Pacific Gas and Electric which services the existing CTP # 2 plant, which is next door to the LEC project site. A portion of the pipeline (about 1.1 miles) has been revised between N. Thornton Road and N. Devries Road, and will

increase the linear corridor by approximately 1,274 feet (0.24 mile). The route change is considered minor and not expected to have a significant impact on the overall project.

WATER SUPPLY

Recycled water would be used for cooling needs for the LEC project and would be provided by a 48-diameter pipeline in the utility corridor connecting the LEC and city of Lodi's WPCF. Potable water for sanitary and domestic use would be provided by a new on-site potable water well. The LEC would produce no non-reclaimable process wastewater.

The LEC's average daily water would be approximately 1.23 million gallons per day (24-hour period), and maximum daily use would be 2.2 million gallons per day during the summer (fired) conditions. The city of Lodi has provided a will serve letter for the project stating that there would be a sufficient amount of recycled water available for the project. On an annual average basis, the recycled water use for the LEC would be about 856 gallons per minute (gpm) or 1,380 acre-feet per/year(AFY). This assumes full-time operation at 8,760 hours per year. However, if one were to consider that operations would be halted for maintenance and other reasons, the facility would not operate all hours. At 4,500 operating hours per/year, total water usage would be 231 million gallons (709 acre-feet per/year).

WASTEWATER DISCHARGE

As stated in the previous section, the LEC would produce no non-reclaimable process wastewater. It will dispose of process wastewater using a new Class I underground injection well (UIW), with the existing Class 1 UIW at the CTP #2 plant used for backup. The remaining small portion would be captured in underground storage tanks and disposed appropriately. During construction, reclaimed water from the project would be controlled in accordance with an engineered drainage system, and oil-water separator, and standard best management practices. This method would also apply to the LEC project's wastewater collection system, which would collect process wastewater runoff and stormwater runoff from all of the plant equipment.

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, NCPA would commence construction of the LEC in 2010. The project is expected to take about 24 months for construction and startup testing, and could begin commercial operation by first quarter of 2012, if there are no delays. The construction period would have an average peak workforce of approximately 168 and 305 respectively, of workers onsite.

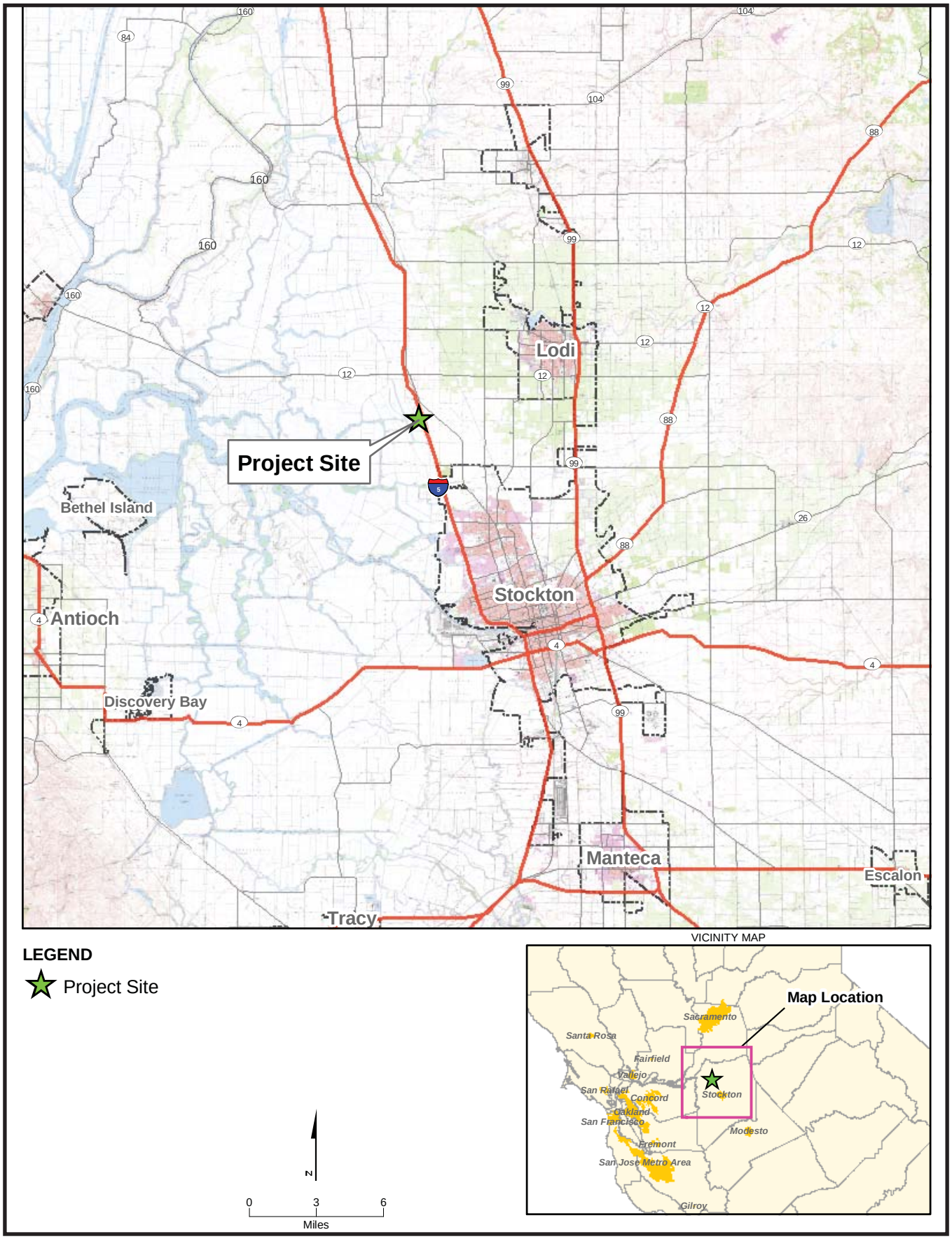
Construction costs including cost of materials and supplies required by the project is estimated to be between $275 million. LEC's initial capital cost estimated to be $298 million. It is estimated that 60% of the construction workforce would reside in San Joaquin County, and that approximately $16.08 million would stay in the local area during the construction period.

Construction access will generally be from North Cord Road. In addition, the LEC proposes to construct a new temporary access road (approximately 100 feet long) connecting the on-ramp to the southbound lanes of I-5 from eastbound State Route 12. The temporary road would require an encroachment permit from the California Department of Transportation (Caltrans). As shown in **Figures 2 & 3**, storage of construction materials and equipment would occur within the proposed laydown areas. Construction worker parking would also occur within the areas.

FACILITY CLOSURE

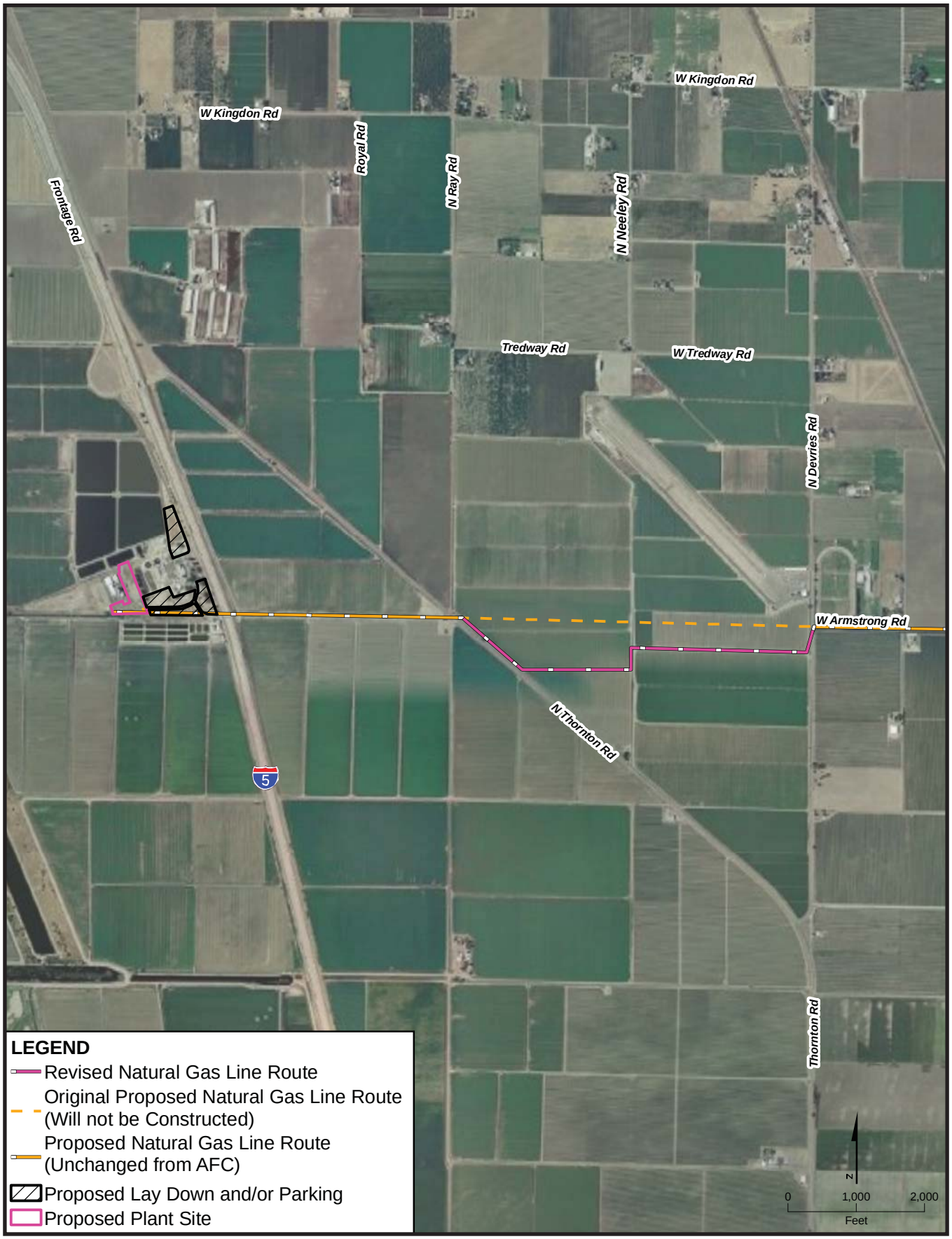
LEC would be designed for an operating life of 30 years, unless the generation power plant is still environmentally and economically viable beyond that point. At an appropriate point beyond that, the project would cease operation and close down. At that time, it would be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Facility closure would need to be consistent with laws, ordinances, regulations and standards in effect at the time of closure. LORS pertaining to facility closure are identified in the technical sections of this assessment.

PROJECT DESCRIPTION - FIGURE 1
Lodi Energy Center - Project Vicinity Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 1.1-2

PROJECT DESCRIPTION - FIGURE 2
Lodi Energy Center - Site Location



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 1.1-3R

PROJECT DESCRIPTION - FIGURE 3

Lodi Energy Center - Proposed Laydown and Parking Areas

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009

SOURCE: AFC Figure 2.1-3

PROJECT DESCRIPTION - FIGURE 4
Lodi Energy Center - Architectural Rendering

SOURCE: AFC Figure 1.1-1

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Brewster Birdsall, P.E., QEP

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification, the proposed Lodi Energy Center (LEC) project would not result in significant air quality related impacts. However, at this time, staff cannot determine whether the Lodi Energy Center project would conform with applicable federal, state and San Joaquin Valley Air Pollution Control District (SJVAPCD or District) air quality laws, ordinances, regulations, and standards (LORS). Staff awaits the results of the District's review of the project including the equipment changes that were proposed by the applicant in July 2009. Staff expects the SJVAPCD to release the review in November 2009, therefore this Staff Assessment is subject to revision to include the District's final conditions.

Staff finds that mitigation would be provided in the form of emission reduction credits (ERCs) as required by District rules, to fully offset all nonattainment pollutants and their precursors at a minimum ratio of one-to-one, and to reduce the potential impacts of the proposed project to less than significant.

Global climate change and greenhouse gas emissions from the project are analyzed in **AIR QUALITY APPENDIX AIR-1**. The LEC project would emit approximately 0.38 metric tonnes of carbon dioxide per megawatt hour (MTCO2/MWh). At these levels, the project would comply with the limits of SB 1368 (Perata, Chapter 598, Statutes of 2006) and the greenhouse gas Emission Performance Standard for base load power plants seeking contracts with California's utilities. Mandatory reporting of the GHG emissions would occur while the Air Resources Board develops greenhouse gas regulations and/or trading markets. The project may be subject to GHG reduction or trading requirements as the GHG regulations become more fully developed and implemented.

INTRODUCTION

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the LEC project. Criteria air pollutants are defined as air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health.

The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter) (PM10) and fine particulate matter (less than 2.5 microns in diameter) (PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide (NO) and NO_2) and volatile organic compounds (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in the context of cumulative impacts (**AIR QUALITY APPENDIX AIR-1**).

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

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	**U.S. Environmental Protection Agency**
Federal Clean Air Act Amendments of 1990, Title 40 Code of Federal Regulations (CFR) Part 50	National Ambient Air Quality Standards (NAAQS).
Clean Air Act (CAA) § 160-169A and implementing regulations, Title 42 United State Code (USC) §7470-7491 40 CFR 51 & 52 (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of pollutants that occur at ambient concentrations that attain the NAAQS. The applicant expects that operation of the facility would not trigger the need for a PSD permit, because annual emissions from the proposed LEC project would be below the trigger levels for a new major stationary source (exceeding 100 tons per year) (NCPA2009b). The PSD program is within the jurisdiction of the U.S. EPA.
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to sources of designated nonattainment pollutants. This requirement is addressed through SJVAPCD Rule 2201.

Applicable Law	Description
40 CFR 60, Subpart KKKK	Standards of Performance for Stationary Combustion Turbines, New Source Performance Standard (NSPS). Requires the proposed combined cycle system to achieve 15 parts per million (ppm) NOx and achieve fuel sulfur standards.
40 CFR 60, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Requires monitoring of the natural gas fuel source for the proposed auxiliary boiler.
CAA §401 (Title IV), 42 USC §7651(Acid Rain Program)	Requires reductions in NOx and SO_2 emissions, implemented through the Title V program. This program is within the jurisdiction of the SJVAPCD with U.S. EPA oversight [SJVAPCD Rule 2540].
CAA §501 (Title V), 42 USC §7661(Federal Operating Permits Program)	Establishes comprehensive federal operating permit program for major stationary sources. Application required within one year following start of operation. This program is within the jurisdiction of the SJVAPCD with U.S. EPA oversight [SJVAPCD Rule 2520].
State	**California Air Resources Board and Energy Commission**
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Prohibits discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.
H&SC §40910-40930	Permitting of source needs to be consistent with approved clean air plan. The SJVAPCD New Source Review program is consistent with regional air quality management plans.
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that Energy Commission decision on AFC include requirements to assure protection of environmental quality.
California Code of Regulations for Off-Road Diesel-Fueled Fleets (13 CCR §2449, et seq.)	General Requirements for In-Use Off-Road Diesel-Fueled Fleets – Requires owners and operators of in-use (existing) off-road diesel equipment and vehicles to begin reporting fleet characteristics to CARB in 2009 and meet fleet emissions targets for diesel particulate matter and NOx in 2010.
Airborne Toxic Control Measure for Idling (ATCM, 13 CCR §2485)	ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling – Generally prohibits idling longer than five minutes for diesel-fueled commercial motor vehicles.

Applicable Law	Description
Local	**San Joaquin Valley Air Pollution Control District**
SJVAPCD Rule 2201 (New and Modified Stationary Sources)	Establishes the pre-construction review requirements for new, modified or relocated emission sources, in conformance with NSR to ensure that these facilities do not interfere with progress in attainment of the ambient air quality standards and that future economic growth in the San Joaquin Valley is not unnecessarily restricted. Establishes the requirement to prepare a Preliminary Determination of Compliance (PDOC) and Final Determination of Compliance (FDOC) during District review of an application for a power plant. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements. The LEC project net emission increase of NOx would exceed the federal major modification threshold (40 CFR 51.165). The SJVAPCD classifies the project as a Federal Major Modification for NOx, and public notification requirements are triggered (SJVAPCD2009a).
SJVAPCD Rule 2520 (Federally Mandated Operating Permits)	Establishes the permit application and compliance requirements for the federal Title V federal permit program. LEC must submit an application to modify the existing Title V permit.
SJVAPCD Rule 2540 (Acid Rain Program)	Implements the federal Title IV Acid Rain Program, which requires subject facilities to obtain emission allowances for SOx emissions and requires fuel sampling and/or continuous monitoring to determine SOx and NOx emissions.
SJVAPCD Regulation IV (Prohibitions)	Sets forth the restrictions for visible emissions, odor nuisance, various air emissions, and fuel contaminants. Regulation IV incorporates the NSPS provisions of 40 CFR 60, including standards for stationary combustion turbines (Subpart KKKK). These rules limit emissions of NOx, VOC, CO, particulate matter, and sulfur compounds.
SJVAPCD Rules 4306 and 4320 (Boilers, Steam Generators and Process Heaters)	Limits NOx and CO emissions from boilers, steam generator and process heaters. The proposed auxiliary boiler is subject to NOx limit of 9 parts per million by volume (ppmv) and CO limit of 400 ppmv.
SJVAPCD Rule 4703 (Stationary Gas Turbines)	Limits the proposed stationary gas turbine emissions of NOx to 5 ppmv over a 3-hour averaging period and CO to 25 ppmv. Provided certain demonstrations are made, the emission limits do not apply during startup, shutdown, or reduced load periods (defined as “transitional operation periods”).
SJVAPCD Regulation VIII (Fugitive PM10 Prohibition)	Requires control of fugitive PM10 emissions from various sources.

SETTING

CLIMATE AND METEOROLOGY

The climate in 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 and 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 the San Joaquin Valley is characterized by hot dry summers and mild winters with precipitation almost exclusively in the winter. Very little precipitation occurs during the summer months because the Pacific high pressure blocks migrating storm systems. Beginning in the fall and continuing through the winter, the storm belt and zone of strong westerly winds begins to greatly influence California. Temperature, winds, and rainfall are variable during fall and winter months, and stagnant conditions occur more frequently than during summer.

Wind speeds are generally higher in summer than in winter and are typically north-northwesterly winds. During the spring, summer, and fall, the stronger winds are caused by a combination of offshore and thermal low pressure resulting from high temperatures in the Central Valley. During the winter months, winds are more variable and are predominantly northerly. Calm conditions occur more during winter, but are relatively infrequent throughout the year. Valley fog often occurs during these calm, stagnant atmospheric conditions, when temperature inversions trap a layer of cool, moist air near the surface. The annual average rainfall in Lodi is 17.2 inches and most precipitation (81%) occurs during November through March. Long-term average temperature and precipitation data from the nearest meteorological station located in Lodi, approximately 5.7 miles east-northeast of the project site, indicates that July is the warmest month of the year, with a normal daily maximum and minimum of 91°F and 56°F. In the winter, December and January are the coldest month of the year, with an average daily maximum and minimum of 54°F and 37°F (WRCC 2009).

Along with the wind flow, atmospheric stability and mixing heights are important factors in the determination of pollutant dispersion. Atmospheric stability is an indicator of the air turbulence and mixing. During the daylight hours of the summer when the earth is heated and air rises, there is more turbulence, more mixing, and thus less stability. During these conditions there is more air pollutant dispersion and therefore usually reduced air quality impacts near any single air pollution source. During the winter months between storms, however, very stable atmospheric conditions occur, resulting in very little mixing. Under these conditions, minimal air pollutant dispersion occurs, and consequently higher air quality impacts may result near sources. Because lower mixing heights generally occur during the winter, along with lower mean wind speeds and less vertical mixing, dispersion occurs less rapidly.

AMBIENT AIR QUALITY STANDARDS

The United States Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (ARB) have both established allowable maximum ambient concentrations of criteria air pollutants, based upon public health impacts called ambient

air quality standards. The California Ambient Air Quality Standards (CAAQS), established by ARB, are typically lower (more stringent) than the federally established National Ambient Air Quality Standards (NAAQS). The federal Clean Air Act requires the periodic review of the science upon which the standards are based and the standards themselves.

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

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

Air Quality Table 2
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	None
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	None
Fine Particulate Matter (PM2.5)	24 Hour	None	35 µg/m^3
	Annual	12 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	None
	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	None
	3 Hour	None	0.5 ppm (1300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual	None	0.03 ppm (80 µg/m^3)

Source: ARB (http://www.arb.ca.gov/research/aaqs/aaqs2.pdf), November 2008.

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

EXISTING AMBIENT AIR QUALITY

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

Air Quality Table 3
Attainment Status of San Joaquin Valley Air Pollution Control District

Pollutants	Federal Classification	State Classification
Ozone (1-hr)	No Federal Standard	**Nonattainment (Severe)**
Ozone (8-hr)	**Nonattainment (Serious)** [a]	**Nonattainment**
PM10	Attainment [b]	**Nonattainment**
PM2.5	**Nonattainment**	**Nonattainment**
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Source: SJVAPCD 2008 (http://www.valleyair.org/aqinfo/attainment.htm).
Notes:
[a] In April 2007, the SJVAPCD Governing Board proposed to re-classify the region as “extreme” nonattainment, and the U.S. EPA is reviewing the request.
[b] In November 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.

Nonattainment Criteria Pollutants

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

Air Quality Table 4
LEC, Highest Measured Concentrations (ppm or µg/m^3)

Pollutant	Averaging Time	2003	2004	2005	2006	2007	2008
Ozone (ppm)	1 hour	**0.104**	**0.096**	**0.099**	**0.109**	**0.093**	**0.105**
Ozone (ppm)	8 hour	**0.088**	**0.08**	**0.086**	**0.092**	**0.081**	**0.090**
PM10 (µg/m^3)	24 hour	**88**	**60**	**79**	**82**	**71**	**104.5**
PM10 (µg/m^3)	Annual	**28.4**	**29.4**	**29.8**	**33.4**	**27.7**	**31.2**
PM2.5 (µg/m^3)	24 hour	**45**	**41**	**63**	**47**	**52**	**81.2**
PM2.5 (µg/m^3)	Annual	**13.6**	**13.2**	**12.5**	**13.1**	**12.9**	**14.4**

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed June 2009.
Notes: Monitoring Station for ozone, PM10, and PM2.5: 2003-2008: Stockton-Hazelton Street.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and VOC, which interact in the presence of sunlight and warm air temperatures to form ozone. Ozone formation is highest in the summer and fall when abundant sunshine and high temperatures trigger the necessary photochemical reactions, and lowest in the winter. The days with the highest ozone concentrations commonly occur between June and August, but the region's ozone management season officially runs from April through November (the second and third calendar quarters, Q2 and Q3).

Respirable Particulate Matter (PM10)

PM10 is a mixture of particles and droplets that vary in size and chemical composition, depending upon the origin of the pollution. An extremely wide range of sources, including natural causes, most mobile sources, and many stationary sources, causes emissions that directly and indirectly lead to increased ambient particulate matter. This makes it an extremely difficult pollutant to manage. Particulate matter caused by any combustion process can be generated directly by burning the fuel, but it can also be formed downwind when various precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulate matter since the contaminants are not directly emitted, but are rather indirectly formed as a result of precursor emissions.

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

Air Quality Table 5 summarizes the ambient PM10 data collected from the nearest monitoring station to the project site and the highest PM10 concentrations in the District.

Air Quality Table 5
LEC, Highest Measured PM10 Concentrations (µg/m^3)

Location	Averaging Time	2003	2004	2005	2006	2007	2008
Bethel Island-Contra Costa	24 hour	49.9	40.0	**61.8**	**82.1**	46.7	**78.2**
	Days Over CAAQS	6	0	6	6	0	18
	Days Over NAAQS	0	0	0	0	0	0
	Annual	19.4	19.5	18.5	19.4	18.8	**24.1**
Stockton-Hazelton Street	24 hour	**88**	**60**	**79**	**82**	**71**	**104.5**
	Days Over CAAQS	17	18	47	63	24	49
	Days Over NAAQS	0	0	0	0	0	0
	Annual	**28.4**	**29.4**	**29.8**	**33.4**	**27.7**	**31.2**
District-wide	24 hour	**150**	**217**	**131**	**304**	**172**	**351**
	Days Over CAAQS	167	113	146	167	145	N/A
	Days Over NAAQS	0	1	0	4	1	18
	Annual	**52.4**	**47.9**	**44.3**	**55.4**	**54.8**	**52.4**

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed June 2009.
Note: Concentrations shown are based upon California reference methods. The number of days above the CAAQS (50 µg/m^3) is calculated by ARB. Because PM10 is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

Air Quality Table 5
LEC, Highest Measured PM10 Concentrations (µg/m^3)

Location	Averaging Time	2003	2004	2005	2006	2007	2008
Bethel Island-Contra Costa	24 hour	49.9	40.0	**61.8**	**82.1**	46.7	**78.2**
	Days Over CAAQS	6	0	6	6	0	18
	Days Over NAAQS	0	0	0	0	0	0
	Annual	19.4	19.5	18.5	19.4	18.8	**24.1**
Stockton-Hazelton Street	24 hour	**88**	**60**	**79**	**82**	**71**	**104.5**
	Days Over CAAQS	17	18	47	63	24	49
	Days Over NAAQS	0	0	0	0	0	0
	Annual	**28.4**	**29.4**	**29.8**	**33.4**	**27.7**	**31.2**
District-wide	24 hour	**150**	**217**	**131**	**304**	**172**	**351**
	Days Over CAAQS	167	113	146	167	145	N/A
	Days Over NAAQS	0	1	0	4	1	18
	Annual	**52.4**	**47.9**	**44.3**	**55.4**	**54.8**	**52.4**

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed June 2009.
Note: Concentrations shown are based upon California reference methods. The number of days above the CAAQS (50 µg/m^3) is calculated by ARB. Because PM10 is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

PM10 is primarily a winter problem, but high regional PM10 levels occur at other times of the year as well. Days with high PM10 concentrations commonly occur in November and December, but the region's PM10 management season officially runs from October through March (the first and fourth calendar quarters, Q1 and Q4). Northern California wildfires in Monterey County, Santa Clara County, and the Sierra Nevada foothills during June 2008 were probably responsible for the most-recent high PM10 concentrations.

Fine Particulate Matter (PM2.5)

Particles and droplets with an aerodynamic diameter less than or equal to 2.5 microns (PM2.5) penetrate more deeply into the lungs than PM10, so can therefore be much more damaging to public health than larger particles. PM2.5 is mainly a product of combustion and includes nitrates, sulfates, organic carbon (ultra-fine dust), and elemental carbon (ultra-fine soot). Almost all combustion-related particles, including those from wood smoke and cooking, are smaller than 2.5 microns. Nitrate and sulfate particles are formed through complex chemical reactions in the atmosphere. Particulate nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NOx emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM2.5. Ammonium sulfate is also a concern because of the ready availability of ammonia in the atmosphere.

Air Quality Table 6 summarizes the ambient PM2.5 data collected from the nearest monitoring station.

Air Quality Table 6
LEC, Highest Measured PM2.5 Concentrations (µg/m^3)

Location	Averaging Time	2003	2004	2005	2006	2007	2008
Stockton-Hazelton Street	24 hour	**45.0**	**41.0**	**63.0**	**47.0**	**52.0**	**81.2**
	Annual	**13.6**	**13.2**	**12.5**	**13.1**	**12.9**	**14.4**

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed June 2009.

Attainment Criteria Pollutants

Carbon Monoxide

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

Nitrogen Dioxide

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

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

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

New CAAQS for NO_2 became effective in early 2008. Although the attainment designations have not yet been established for the new, more stringent standards, the San Joaquin Valley air basin appears likely to attain. Data from 2006 to 2008 shows the highest observed hourly concentration for the entire San Joaquin Valley (0.101 ppm) is well below the new 0.18 ppm NO_2 standard (ARB 2009).

Sulfur Dioxide

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

Summary of Existing Ambient Air Quality

The local and recent ambient air quality data show existing violations of ambient air quality standards for ozone, PM10, and PM2.5. Staff uses the highest local (Stockton) background ambient air concentrations as the baseline in staff's analysis of potential ambient air quality impacts for the proposed LEC project. Data from the nearest site in Stockton is used for CO and NO_2, and the Bethel Island site is used for SO_2. The highest concentrations are shown in **Air Quality Table 7**.

Air Quality Table 7
LEC, Highest Local Background Concentrations
Used in Staff Assessment (µg/m^3)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM10	24 hour	**104.5**	50	**209**
	Annual	**33.4**	20	**167**
PM2.5	24 hour	**81.2**	35	**232**
	Annual	**14.4**	12	**120**
CO	1 hour	5,500	23,000	24
	8 hour	2,640	10,000	26
NO_2	1 hour	147	339	43
	Annual	34	57	60
SO_2	1 hour	46.9	655	7
	24 hour	18.3	105	17
	Annual	5.2	80	7

Source: AFC Table 5.1-28, updated with ARB 2009.
Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment.

Existing Emissions

The proposed Lodi Energy Center (LEC) facility would be located in Lodi, San Joaquin County, California, on a 4.4-acre parcel located adjacent to the city of Lodi's White Slough Water Pollution Control Facility (WPCF) and the Northern California Power Agency (NCPA) Combustion Turbine Project #2 (STIG plant). The equipment at the existing NCPA STIG plant consists of one 49 MW General Electric (GE) LM-5000 natural gas-fired, steam-injected combustion turbine generator (permitted heat input capacity of 463 million British thermal units per hour [MMBtu/hr], Response to DR59, CH2M2009g), and one 240 HP Cummins diesel fire pump engine. There is also a small cooling tower for the STIG plant, which would be relocated to accommodate the proposed LEC plant.

NCPA would be a common owner and operator of the existing STIG plant and the proposed LEC plant, therefore some existing facilities would be shared between the two plants as following.

Shared Existing Facilities:

- The anhydrous ammonia system, including both the 12,000-gallon storage tank and unloading facilities;
- The 230-kilovolt (kV) switchyard and interconnect;
- The fire systems, including fire water storage tanks and diesel-fired emergency fire pump engine;

- The domestic water systems, including eye wash stations and emergency showers; and
- The existing Class I underground injection well (to be used for backup only).

The existing STIG plant CTG and fire pump engine currently operate on an as-needed basis, with an annual capacity factor of about 20% (1,800 hours annually) for each recent year (Response to DR58, CH2M2009g). **Air Quality Table 8** summarizes the allowable (permitted) emissions for the existing STIG plant and the average actual emissions including 2006, 2007, and the first nine months of 2008.

Air Quality Table 8
Existing NCPA STIG Plant, Allowable Emissions and Actual Emissions (lb/yr)

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Existing Allowable Emissions	**20.4**	**25.9**	**8.8**	**58.8**	**5.7**
Existing STIG Plant 2006	3.7	3.4	1.4	3.8	0.2
Existing STIG Plant 2007	3.5	4.3	1.8	4.7	0.2
Existing STIG Plant 2008 (Q1 to Q3)	3.3	4.0	1.7	4.6	0.2

Source: AFC Table 5.1-14 and Responses to DR58 and 59 (CH2M2009g).

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The proposed LEC combined cycle power plant would include the following stationary sources of emissions (AFC Section 2.1.4 updated by Supplement D, CH2M2009c):

- A stationary natural-gas fired combustion turbine generator (CTG), Siemens “Flex Plant 30” with rapid startup technology, nominal power generation rate of 185 MW at a heat input capacity of 2,142 MMBtu/hr, in a combined-cycle configuration with a heat recovery steam generator (HRSG) that does not use duct firing;
- One condensing steam turbine generator (STG) rated at 95 MW (nominal);
- One 36.5 MMBtu/hr capacity natural gas-fired auxiliary boiler with ultra low NOx burner(s);
- A new 7-cell cooling tower; and
- An administration building, including the control room, office space, maintenance shop, warehouse, and communication systems shared by the LEC and STIG plants.

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

Proposed Construction Emissions

Construction of LEC is expected to take about 24 months. Onsite construction activities include site preparation, foundation work, installation of major equipment, and construction/installation of major structures. During the construction period, air emissions would be generated from the exhaust of off-road/non-road construction equipment and on-road vehicles and fugitive dust from activity on unpaved surfaces and

material handling. Construction activities would typically occur between 6 a.m. and 11 p.m., Monday through Saturday (AFC Section 2.2). Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities such as pouring concrete at night during hot weather, working around time-critical shutdowns and constraints. The applicant expects to use U.S. EPA Tier 3 certified engines for on-site (offroad) construction equipment larger than 100 horsepower and Tier 2 certified engines for equipment under 100 hp (AFC Appendix 5.1E). During some construction period and during the initial commissioning phase of the project, some activities would continue 24 hours per day, 7 days per week. The project would also include a new 2.5 mile long natural gas pipeline (AFC Section 2.1.8) and a connection to an existing recycled water pipeline (AFC Section 2.1.10). These linear facilities would be constructed in a 2-month window prior to or simultaneously with the construction of the project.

Fugitive dust emissions would result from (AFC Appendix 5.1E.1.1):

- Dust entrained during site preparation and grading/excavation at the construction site;
- Dust entrained during on-site travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of soil at areas disturbed during construction activities.

Combustion-related emissions would be the result of:

- Exhaust from the diesel construction equipment used for site preparation, grading, excavation, trenching, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from portable welding machines;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel and construction supplies to the construction site; and
- Exhaust from automobiles used by workers to commute to the construction site.

Estimates for the highest daily emissions and total annual emissions over the 24-month construction period are shown in **Air Quality Table 9**.

Air Quality Table 9
LEC, Estimated Maximum Construction Emissions

Construction Activity	NOx	VOC	PM10	PM2.5	CO	SOx
On-site Construction Equipment (lb/day)	80.6	7.7	4.5	4.5	51.4	0.1
On-site Fugitive Dust (lb/day)	---	---	21.0	4.9	---	---
Off-site (On-road) Worker Travel, Truck Deliveries, Dust (lb/day)	179.5	24.9	8.5	8.5	187.2	0.25
Off-site Linear Facility Equipment and Fugitive Dust (lb/day)	96.8	8.5	10.8	4.8	48.7	0.10
Maximum Daily Construction Emissions (lb/day)	**356.9**	**41.1**	**44.8**	**22.7**	**287.3**	**0.45**
On-site Construction Equipment (tpy)	7.2	0.7	0.4	0.4	4.6	0.01
On-site Fugitive Dust (tpy)	---	---	1.6	0.3	---	---
Off-site (On-road) Worker Travel & Truck Deliveries (tpy)	2.3	1.7	0.2	0.2	17.7	0.02
Off-site Linear Facility Equipment and Fugitive Dust (tpy)	2.1	0.2	0.2	0.1	1.0	<0.01
Peak Annual Construction Emissions (tpy)	**11.6**	**2.6**	**2.4**	**1.0**	**23.3**	**0.03**

Source: AFC Appendix 5.1E Tables 5.1E-1 and 5.1E-2, Attachment 5.1E-1, and Table DR56-8 (CH2M2009g). Worst-case totals assume simultaneous maximum emissions during linear facility construction.
Note: Different activities have maximum emissions at different time during the construction period; therefore, total maximum daily, monthly, and annual emissions might be different from the summation of emissions from individual activities.

Proposed Initial Commissioning Emissions

New electrical generation facilities must go through initial commissioning phases before becoming commercially available to generate electricity. During this period, initial firing causes greater emissions than those that occur during normal operations because of the need to tune the combustor, conduct numerous startups and shutdowns, operate under low loads, and conduct testing before emission control systems are functioning or fine-tuned for optimum performance.

The applicant expects that approximately 292 hours of operation over approximately 28 days would be needed to the accomplish the various following commissioning activities (NCPA2008b):

- Full Speed No Load Tests (FSNL) – a test of the gas turbine ignition system, a test to ensure that the CTG is synchronized with its electric generator, and a test of the CTG's speed control system.
- Steam Blows – steam is passed through the CTG and HRSG to remove all debris that could potentially damage the SCR and oxidation catalysts.

- Minimum Load Tests and Full Load Tests (without SCR Operational) – several days of tuning the CTG combustor to minimize emissions and perform other checks.
- Multiple Load Tests (SCR/Oxidation Catalyst Operational at Various Levels) – several days of installing control systems and tuning to achieve NOx and CO control at design levels.
- Performance Tests (SCR/Oxidation Catalyst at Full Control) – several days of the CTG operating from minimum to maximum load to confirm emissions performance.

Air Quality Table 10 presents the applicant's anticipated maximum hourly and daily short-term emissions of criteria pollutants (CH2M2009c). Maximum hourly and daily emissions for NOx and CO would occur with the gas turbine in the steam blow phase and partial load tests before emission control systems are installed and operational. Emission rates for VOC, PM10, PM2.5, and SOx during initial commissioning are not expected to be higher than normal operating emissions. This is because PM10 and SOx emissions are proportional to fuel use. The total initial commissioning emissions are presented in **Air Quality Table 10.**

Air Quality Table 10
LEC, Maximum Initial Commissioning Emissions (hourly and daily)

Commissioning Source	NOx	VOC	PM10/ PM2.5	CO	SOx
CTG/HRSG (lb/hr)	400.0	16.0	9.0	2,000	6.1
CTG/HRSG (lb/day)	4,000	192	108	20,000	73.1

Source: Table AQ-2, Supplement B for Data Adequacy (NCPA2008b); Table 5.1B-7bR (CH2M2009c).

Operation Emission Controls

NOx Controls

The combustion turbine would use dry low-NOx (DLN) combustors to maintain low levels of NOx formation while ensuring complete combustion of the fuel. Exhaust from each turbine would enter the HRSG and Selective Catalytic Reduction (SCR) system before being released into the atmosphere. SCR refers to a process that chemically reduces NOx to nitrogen (N_2) and water vapor (H_2O) by injecting ammonia (NH_3) into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires the uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

VOC and CO Controls

Emissions of CO and unburned hydrocarbons, including VOC, will be controlled with an oxidation catalyst installed in conjunction with the SCR catalyst. An oxidation catalyst

system chemically reacts with organic compounds and CO with excess oxygen to form carbon dioxide (CO_2) and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals.

PM10/PM2.5 and SOx Controls

The exclusive use of pipeline-quality natural gas, a clean-burning fuel that contains very little sulfur or noncombustible solid residue, will limit the formation of SOx and particulate matter. Natural gas does contain small amounts of a sulfur-based scenting compound known as mercaptan, which results in some SOx emissions when burned. However, in comparison with other fossil fuels used in thermal power plants, SOx emissions from natural gas are very low. Particulate matter emissions from natural gas combustion are also very low compared with other fossil fuels. The sulfur content of pipeline-quality natural gas is normally less than 1 grain of sulfur per 100 cubic feet at standard temperature and pressure (gr/100 scf). High-efficiency air inlet filtration and a lube oil vent coalesce would also be used to control particulate emissions.

Proposed Operation Emissions

Air Quality Table 11 through **Air Quality Table 14** summarize the maximum (worst-case) criteria pollutant emissions associated with the LEC project's normal and routine operation. Emissions for the combustion turbine system are based upon:

- NOx emissions controlled to 2.0 parts per million by volume, dry basis (ppmvd) corrected to 15% oxygen, averaged over any 1-hour period;
- VOC emissions controlled to 1.4 ppmvd at 15% O_2 for any 3-hour period;
- CO emissions controlled to 2.0 ppmvd at 15% O_2 for any 3-hour period, revised downward from original proposal of 3.0 ppm (NCPA2009b);
- PM10 emissions at 9.0 lb/hr based on exclusive use of pipeline-quality natural gas fuel with no provisions for an alternative or backup fuel;
- SOx emissions based on hourly or daily levels of fuel sulfur content of up to 1 gr/100 scf;
- Allowing a periodic CTG combustor tuning with each duration not to exceed 12 hours, after every 8,000 hours of operation or after 450 starts for replacing components of the combustor that have a limited operational life (Response to DR64, CH2M2009g); and
- CTG firing of 7,824 hours annually including 7,590 hours of normal operation and 234 hours annually in startup mode (for the worst-case NOx, VOC, and CO estimates, per NCPA2009b) with the option of operating up to 8,760 hours annually in steady-state mode (for the worst-case PM10/PM2.5 and SOx estimates) and 4,000 hours per year of operation of the auxiliary boiler.

Air Quality Table 11 lists the maximum hourly emissions from each piece of proposed equipment estimated by the applicant. Emissions for NOx, CO, and VOC during startup and shutdown events would have higher emissions than during normal operation. Since PM10 and SOx emissions are proportional to fuel use, PM10 and SOx have higher emissions rates during full-load operation.

Air Quality Table 11
LEC, Maximum Hourly Emissions Rates (pounds per hour [lb/hr])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
CTG/HRSG	15.54	3.79	9.0	9.46	6.1
CTG/HRSG (during startup or periodic tuning)	160	16.00	9.0	500	6.1
Auxiliary Boiler	0.31	0.15	0.28	1.34	0.10
Cooling Tower	---	---	0.93	---	---

Source: AFC Table 5.1-21R, Appendix A Table 5.1A-6R (CH2M2009c) and (NCPA2009b).

Air Quality Table 12 lists the worst-case emissions during any given day of operation of the proposed LEC project. Daily combustion turbine emissions for NOx, VOC, and CO are based on six hours in a startup/shutdown mode and 18 hours of full load operation, and for PM10 and SOx daily emissions are based on 24 hours of operation. The auxiliary boiler emissions are based on 24 hours per day (CH2M2009c), and cooling tower emissions are based on 24 hours of operation per day. Emergency fire pump emissions are not estimated in this project analysis, since the existing emergency fire pump of STIG would be shared and unaffected by the proposed LEC project.

Air Quality Table 12
LEC, Maximum Daily Emissions (pounds per day [lb/day])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
CTG/HRSG	879.7	164.3	216.0	3,170.3	146.4
Auxiliary Boiler	7.4	3.7	6.7	32.1	2.5
Cooling Tower	---	---	22.3	---	---
Total Project	887.0	167.9	245.1	3,202.4	148.9

Source: AFC Table 5.1-21R, Appendix A Table 5.1A-6R (CH2M2009c) and independent staff assessment (per NCPA2009b).

Air Quality Table 13 lists maximum potential annual emissions from each source for the proposed project, based on applicant and District calculations reviewed by staff. The operating assumptions include CTG firing for 7,824 hours annually including 234 hours in startup mode (for the worst-case NOx, VOC, and CO estimates) with the option of operating up to 8,760 hours annually in steady-state mode (for the worst-case PM10 and SOx estimates). Auxiliary boiler emissions are based on 4,000 operating hours per year and cooling tower emissions are based on 8,760 operating hours.

Air Quality Table 13
LEC, Maximum Annual Emissions (tons per year [tpy])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
CTG/HRSG	70.7	16.3	39.4	94.4	26.7
Auxiliary Boiler	0.6	0.3	0.6	2.7	0.2
Cooling Tower	---	---	4.1	---	---
Total Maximum Annual Emissions	**71.3**	**16.6**	**44.1**	**97.1**	**26.9**

Source: Lodi AFC Table 5.1-21R, Appendix A Table 5.1A-6R (CH2M2009c) and independent staff assessment (per NCPA2009b).

Air Quality Table 14 shows the offsite emissions that would be caused by mobile sources accessing the facility. These offsite emissions are based on the assumption that seven new full time workers would be onsite, 365 days per year, and that commuting distances for workers are 50 miles per day per roundtrip. The facility would also require material deliveries, which would occur up to 12 times per week. Roundtrip vehicle miles traveled for material deliveries are estimated to be 50 miles.

Air Quality Table 14
LEC, Annual Offsite Emissions (pounds per year [lb/yr])

Source	NOx	VOC	PM10	PM2.5	CO	SOx
Worker Commutes [a]	113	112	10.9	3.8	1,180	1.1
Material Deliveries [b]	1,180	92	49.0	42.8	440	1.0
Total Annual Emissions (lb/yr)	**1,293**	**204**	**59.9**	**46.6**	**1,620**	**2.1**

Source: Response to DR57 and Attachment DR57-1 (CH2M2009g).
Notes: a. Worker commutes are based on 7 new full time workers, commuting 50 miles daily per roundtrip, 365 days per year.
b. Material deliveries are based on 12 deliveries per week, traveling 50 miles per roundtrip.

Ammonia Emissions

Ammonia is injected into the flue gas stream as part of the SCR system that controls NOx emissions. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip.

The applicant proposes to limit ammonia slip emissions from the combined-cycle turbine system to 10 ppmvd. However, Energy Commission staff recommends that combined-cycle systems follow the Air Resources Board recommendation of 5 ppmvd for ammonia slip, established in the Guidance for Power Plant Siting (ARB 1999).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

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

Dispersion models complete the complex, repeated calculations that consider emissions in the context of various ambient meteorological conditions, local terrain, and nearby structures that affect air flow. For the LEC project, the surface meteorological data used as an input to the dispersion model included five years (2000-2004) of hourly wind speeds and directions measured at the Stockton meteorological station, combined with upper-air meteorological data from Oakland International Airport monitoring station. The District released newer meteorological data (2004-2008) in mid-2009 and removed 2001 from the recommended set due to a data deficiency. However, since the 2000-2004 set was the most up-to-date at the time the LEC project application was filed, it is acceptable for this staff assessment. If, as part of the ongoing District review, the 2004-2008 meteorological data must be used, then slightly different project impacts could result.

The applicant conducted the air dispersion modeling based on guidance presented in the *Guideline on Air Quality Models* (EPA, 2005) and the American Meteorological Society/Environmental Protection Agency Regulatory Model known as AERMOD (version 07026) for an analysis of the operating-phase emissions. The U.S. EPA designates AERMOD as a “preferred” model for refined modeling in all types of terrain. For determining NO_2 impacts of short-term emissions (1-hour averaging period), NOx emissions are further modeled using the more-rigorous Plume Volume Molar Ratio Method (PVMRM) adaptation of the Ozone Limiting Method (OLM). Because project NOx emissions would be approximately 90% NO that could oxidize into NO_2 with

sufficient time, sunlight, and availability of organic compounds or ozone, use of the PVMRM and OLM is appropriate. Concurrent hourly ozone data from Stockton monitoring station is used in modeling the reactive NOx and NO_2 impacts.

Project-related modeled concentrations are then added to highest background concentrations to arrive at the total impact of the project. The total impact is then compared with the ambient air quality standards for each pollutant to determine whether the project's emissions would either cause a new violation of the ambient air quality standards or contribute to an existing violation.

Construction Impacts and Mitigation

This section discusses the project's short-term direct construction ambient air quality impacts assessed by the applicant and, as necessary, independently assessed by Energy Commission staff. The ambient air quality impacts are modeled using AERMOD, and the impacts for NO_2 are modeled using the ozone limiting method (OLM). Construction modeling for LEC used five years of meteorological data (2000-2004 from Stockton) prepared by SJVAPCD, with concurrent ozone data also from Stockton for modeling reactive NOx and NO_2.

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

Air Quality Table 15
LEC, Construction-Phase Maximum Impacts (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	35.6	**104.5**	**140.1**	50	**280**
	Annual	4.2	**33.4**	**37.6**	20	**188**
PM2.5	24 hour	10.2	**81.2**	**91.4**	35	**261**
	Annual	1.1	**14.4**	**15.5**	12	**129**
CO	1 hour	210	5,500	5,710.0	23,000	25
	8 hour	94	2,640	2,734.0	10,000	27
NO_2	1 hour [a]	91.6	147	238.6	339	70
	Annual [a]	3.6	34	37.6	57	66
SO_2	1 hour	0.4	46.9	47.3	655	7
	24 hour	0.1	18.3	18.4	105	18
	Annual	0.01	5.2	5.2	80	7

Source: AFC Appendix 5.1E Table 5.1E-4.
Note: a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO_2, using national default 0.75 ratio.

The maximum modeled project construction impacts are predicted to occur near the eastern and western fence lines for the worst 1-hour impacts and at the southern fence line for the 24-hour impacts. For each pollutant, the concentrations would decrease rapidly with distance. The nearest residential receptors are approximately 0.75 miles to the north, not near the fence line.

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

Construction Mitigation

The applicant proposes to reduce construction-related emissions of particulate matter, particulate matter precursors, and ozone precursors by implementing measures consistent with local air district recommendations, soil erosion control requirements, and nuisance prohibitions (AFC Section 5.1.3.8). Emissions mitigation and/or control techniques proposed by the applicant for reducing engine emissions during construction of LEC include:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards for construction equipment, including, but not limited to, catalytic converter systems and diesel particulate filter systems.

The applicant-proposed control strategies for fugitive dust emissions during construction of LEC include:

- Use either water application or chemical dust suppressant application to control dust emissions from onsite unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surfaces to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;

- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on all unpaved site areas to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

Staff agrees that the applicant's proposed mitigation would be effective, although staff believes that additional construction mitigation measures could reduce potential impacts even more.

Additional measures recommended by staff would reduce construction-phase impacts to a less than significant level by further reducing construction emissions of particulate matter and combustion contaminants. Staff believes that the short-term and variable nature of construction activities warrants a qualitative approach to mitigation. Construction emissions and the effectiveness of mitigation varies widely depending on variable levels of activity, the specific work taking place, the specific equipment, soil conditions, weather conditions, and other factors, making precise quantification difficult. Despite this variability, there are a number of feasible control measures that can be implemented to significantly reduce construction emissions. The applicant included in its AFC and staff proposes requiring extensive use of heavy diesel-powered construction equipment with ARB-certified low emission diesel engines. In addition, staff proposes that prior to beginning construction the applicant should provide an Air Quality Construction Mitigation Plan (AQCMP) that specifically identifies mitigation measures to be employed by NCPA to limit air quality impacts during construction. Staff includes proposed staff Conditions of Certification **AQ-SC1** through **AQ-SC5** to implement these requirements. These conditions are consistent with both the applicant's proposed mitigation and the conditions of certification adopted in similar prior licensing cases. Compliance with these conditions would substantially eliminate the potential for significant air quality impacts during construction of the LEC project.

Operation Impacts and Mitigation

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

Routine Operation Impacts

A refined dispersion modeling analysis was performed to identify off-site criteria pollutant impacts that would occur from routine operational emissions throughout the life of the project. The worst case 1-hour NO_2 and CO impacts reflect startup impacts, and all other impacts reflect the impacts during normal operation. The modeled impacts are extremely conservative, since the maximum impacts are evaluated under a combination

of highest allowable emission rates and the most extreme meteorological conditions, which are unlikely to occur simultaneously. The operating profiles are shown in **Air Quality Table 11** to **Air Quality Table 13**. The predicted maximum concentrations of non-reactive pollutants are summarized in **Air Quality Table 16**.

Air Quality Table 16
LEC, Routine Operation Maximum Impacts (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	3.7	**104.5**	**108.2**	50	**216**
	Annual	0.6	**33.4**	**34.0**	20	**170**
PM2.5	24 hour	3.7	**81.2**	**84.9**	35	**243**
	Annual	0.6	**14.4**	**15.0**	12	**125**
CO	1 hour	337.3	5,500	5,837.3	23,000	25
	8 hour	110.2	2,640	2,750.2	10,000	28
NO_2	1 hour [a]	28.5	147	175.5	339	52
	Annual	0.6	34	34.6	57	61
SO_2	1 hour	3.8	46.9	50.7	655	8
	24 hour	1.4	18.3	19.7	105	19
	Annual	0.2	5.2	5.4	80	7

Source: AFC Table 5.1-29R (CH2MHILL2009c).
Note: a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

Staff believes that particulate matter emissions from routine operation would cause a significant impact because they will contribute to existing violations of PM10 and PM2.5 ambient air quality standards. Significant secondary impacts would also occur for PM10, PM2.5, and ozone because operational emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would also contribute to existing violations of these standards. The direct impacts of NO_2, in conjunction with worst-case background conditions, would not create a new violation of the 1-hour or annual NO_2 ambient air quality standard. The direct impacts of CO and SO_2 would not be significant because routine operation of the project would neither cause nor contribute to a violation of these standards. Mitigation for emissions of PM10, PM2.5, SOx, NOx, and VOC would be appropriate for reducing impacts to PM10, PM2.5, NO_2, and ozone.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SOx, VOC, and ammonia are precursor pollutants that can contribute to the formation of secondary pollutants, ozone, PM10, and PM2.5. Gas-to-particulate conversion in ambient air involves complex chemical and physical processes that depend on many factors, including local humidity, pollutant travel time, and the presence of other compounds. Currently, there are no agency-recommended models or procedures for estimating ozone or particulate nitrate or sulfate formation from a single project or source. However, because of the known

relationships of NOx and VOC to ozone and of NOx, SOx, and ammonia emissions to secondary PM10 and PM2.5 formation, it can be said that unmitigated emissions of these pollutants would contribute to higher ozone and PM10/PM2.5 levels in the region. Significant impacts of ozone and PM10/PM2.5 precursors would be mitigated with SJVAPCD offsets (**AQ-SC7**).

Ammonia is a particulate precursor but not a criteria pollutant. Reactive with sulfur and nitrogen compounds, ammonia is especially abundant in the San Joaquin Valley from natural sources, agricultural sources, and as a byproduct of tailpipe controls on motor vehicles. Ammonia particulate forms more readily with sulfates than with nitrates, and particulate formation in the San Joaquin Valley has been found to be limited by the availability of SOx and NOx in ambient air, rather than the availability of ammonia (SJVAPCD 2008 PM2.5 Plan). Offsetting SOx and NOx emissions would both avoid significant secondary PM10/PM2.5 impacts and reduce secondary pollutant impacts to a less than significant level.

Energy Commission staff recommends limiting ammonia slip emissions to the extent feasible. After conducting discovery of this issue (Data Request 63, CH2M2009g), and consistent with the previously mentioned ARB guidance on ammonia slip, staff recommends a condition of certification establishing an ammonia slip limit for the combustion turbine at 5 ppmvd (**AQ-SC9**).

Fumigation Impacts

There is the potential that higher short-term concentrations of pollutants may occur during fumigation conditions. Fumigation conditions are generally short-term in nature and only compared to 1-hour standards. The applicant analyzed the air quality impacts for normal emissions under fumigation conditions using the SCREEN3 Model (AFC Table 5.1-27R, CH2M2009c). In the fumigation impact analysis, only impacts from the turbine stack are evaluated. For comparison, the same operating scenario identified in the operational impact analysis is considered for fumigation. The short-term project impacts during fumigation would not exceed the impacts for routine operation shown in **Air Quality Table 16**, above. Therefore, no additional mitigation is required for fumigation impacts.

Commissioning-Phase Impacts

Commissioning impacts would occur over short-terms within the 28 days expected to be needed to complete the commissioning period. The commissioning emissions estimates are based on partial load operations before the emission control systems become operational, as in **Air Quality Table 10**. Impacts due to PM10, PM2.5, and SO_2 during commissioning would occur under similar exhaust conditions as those for startup while in routine operation because these emissions are proportional to fuel use. **Air Quality Table 17** shows that the commissioning-phase impacts of CO and NO_2 would be somewhat higher than those during routine operations. Commissioning-phase impacts to particulate matter and ozone concentrations would be addressed with the mitigation identified above for routine operations.

Air Quality Table 17
LEC, Commissioning-Phase Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
CO	1 hour	748.6	5,500	6,248.6	23,000	27
	8 hour	526.2	2,640	3,166.2	10,000	32
NO_2	1 hour [a]	47.8	147	194.8	339	57

Source: AFC Table 5.1-30 R (CH2MHILL2009c).
Note: a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

Visibility Impacts

A visibility analysis of the project's gaseous emissions would not be required because the LEC project would not qualify as a new major stationary source under the federal Prevention of Significant Deterioration (PSD) permitting program. For projects subject to PSD review by the U.S. EPA, a visibility analysis would address the nearest federally-protected Class I area. The nearest Class I areas are as follows (NCPA2008a):

- Mokelumne Wilderness 106 kilometers (km)
- Emigrant Wilderness 120 km
- Desolation Wilderness 122 km
- Yosemite National Park 124 km
- Point Reyes National Seashore 127 km

Due to its distance from Class I areas being over 100 kilometers, and due to the potential emissions of the project being less than the PSD applicability thresholds, Energy Commission staff anticipates that the project's impacts to visibility would be insignificant.

Mitigation for Routine Operation

Applicant's Proposed Mitigation

The LEC project includes a combination of clean-fuel-firing equipment, emission control devices, and emission reduction credits to mitigate air quality impacts. The equipment description, equipment operation, and emission control devices are provided in **AIR QUALITY PROJECT DESCRIPTION**.

Emission Controls

The proposed combustion turbine would limit NOx formed during combustion using dry low-NOx (DLN) combustors. Compared to steam or water-injection designs, combustors designed for low-NOx firing maintain low temperatures, thus minimizing NOx formation, while thermal efficiencies remain high. To further reduce the emissions from the combustion turbine before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed in the HRSG. NCPA proposes two catalyst systems: the SCR system to reduce NOx; and the oxidation catalyst system to reduce CO and VOC. Operating exclusively on pipeline quality natural gas limits SOx and

particulate matter emissions. Additionally, the auxiliary boiler would include ultra low-NOx burners to achieve the District's limits. The proposed project would also achieve additional reduction in emissions by sharing facilities such as the fire protection system with the existing STIG.

Emission Offsets

In addition to emission control strategies included in the project design, SJVAPCD Rule 2201 requires LEC to provide emission reduction credits to offset the new emissions of NOx, VOC, PM10, and SOx. **Air Quality Table 18** summarizes the SJVAPCD Rule 2201 offset requirements for the LEC project, with offsets assumed to originate from shutdowns at sources located more than 15 miles away (distance offset ratio of 1.5-to-1). The SJVAPCD conducted a case-by-case analysis of requirements and distance ratios depending on the specific ERCs held by the applicant (SJVAPCD 2009a), which needs to be updated by SJVAPCD to reflect the currently-proposed Siemens CTG.

Air Quality Table 18
LEC, SJVAPCD Offset Determination and Requirements (lb/yr)

Source	NOx	VOC	PM10	CO	SOx
CTG/HRSG	141,340	32,520	78,840	188,800	53,432
Auxiliary Boiler	1,229	613	1,120	5,350	416
Cooling Tower	0	0	8,157	0	0
LEC Potential to Emit	**142,569**	**33,133**	**88,117**	**194,150**	**53,848**
Offset Requirements					
Existing NCPA STIG Potential Emissions	40,977	51,837	17,524	117,553	11,571
SJVAPCD Offset Threshold	20,000	20,000	29,200	200,000	54,750
Offsets Required by SJVAPCD for LEC [a, b]	142,569	33,133	76,441	---	10,669
Offsets Required by SJVAPCD at LEC [c]	**213,854**	**49,700**	**114,662**	**---**	**16,004**

Source: Independent staff assessment, subject to revision after release of SJVAPCD Determination of Compliance.
Note:
a. Emission offsets are not required for CO if the applicant demonstrates to the satisfaction of the Air Pollution Control Officer (APCO) that the ambient air quality standards are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of the standards.
b. SJVAPCD's offsetting rules exempt sources that have potential emissions below the offset threshold, allowing a credit for PM10 and SOx from the existing STIG in this case. This reduces the amount of offsets required for PM10 and SOx caused by LEC.
c. Includes a distance ratio factor of 1.5 for ERCs that would originate from sources over 15 miles away.

The proposed LEC project would be required to surrender offsets according to a quarterly and annual operating profile developed and proposed by the applicant (AFC Table 5.1-15R, CH2M2009c). The applicant's operating profile assumes that startups are not distributed evenly throughout the year, and that during Q3 and Q4, fewer starts would be needed than in Q1 and Q2. The facility is limited in its operation in terms of its quarterly and annual emissions (Conditions of Certification **AQ-37** to **AQ-43**) and emissions during startups (**AQ-26**), rather than its heat input rate or other direct operating limits.

Emission Offsets for Ozone Impact

Air Quality Table 19 summarizes NOx and VOC offset requirements and identifies the sources of offsets proposed by NCPA. The applicant holds numerous NOx and VOC ERCs that it intends to use to satisfy the District offset requirements. Both NOx and VOC emissions are recognized precursors to the formation of ambient ozone, and NOx is also a recognized precursor to the formation of the nitrate fraction of fine particulate matter.

Air Quality Table 19
LEC, NOx and VOC Offset Holdings and Quarterly Offset Requirements (lb/qtr)

Name of Offset / Site of Reduction	ERC Number	Q1 (lb/qtr)	Q2 (lb/qtr)	Q3 (lb/qtr)	Q4 (lb/qtr)
NOx Offsets Held by NCPA					
Bakersfield	S-2857-2	0	0	0	1,031
HOW, Kern County	S-2848-2	1,457	0	1,145	2,959
HOW, Kern County	S-2849-2	2,682	3,241	938	687
HOW, Kern County	S-2850-2	23,349	23,151	24,224	24,469
HOW, Kern County	S-2851-2	1,019	2,105	1,303	264
HOW, Kern County	S-2852-2	2,296	7,000	9,353	954
HOW, Kern County	S-2854-2	0	1,437	0	0
HOW, Kern County	S-2855-2	400	79	4,227	12,090
Hanford	C-915-2	129	137	122	117
Hanford	C-916-2	8,966	1,122	303	0
Fresno	C-914-2	4,702	6,728	3,983	1,831
4000 Yosemite Blvd, Modesto	N-755-2	0	0	27,616	0
202 N Filbert, Stockton	N-754-2	321	274	790	147
Tupman	S-2894-2	9,367	22,816	6,006	26,405
HOW, Kern County	S-2895-2	0	0	0	3,406
NOx Mitigation Total	---	**54,688**	**68,090**	**80,010**	**74,360**
Quarterly NOx Emissions	---	**38,348**	**38,721**	**37,436**	**38,150**
NOx Fully Offset?	---	Yes	Yes	Yes	Yes
VOC Offsets Held by NCPA					
Bakersfield	S-2860-1	12,600	12,600	12,600	12,600
Surplus NOx ERCs (to offset VOC)	(above)	16,340	29,369	42,574	36,210
VOC Mitigation Total	---	**28,940**	**41,969**	**55,174**	**48,810**
Quarterly VOC Emissions	---	**8,240**	**8,331**	**8,571**	**8,477**
VOC Fully Offset?	---	Yes	Yes	Yes	Yes

Source: Quarterly Emissions do not total the LEC Potential to Emit because of differences in the applicant's quarterly operating profile (CH2M2009c) and the annual operating profile (NCPA2009b). Quantities shown here are subject to revision after release of SJVAPCD Determination of Compliance.
Note: The Name of Offset / Location shows the ERC owner or the location of the reduction in terms of the three SJVAPCD regions. Former ERC owner HOW means Heavy Oil Western.

NCPA appears to be in compliance with the District's NOx and VOC offset requirements and would provide overall total ERCs for ozone precursors at an offset ratio of greater

than one-to-one, which satisfies the CEQA mitigation requirements for ozone impacts as established by Energy Commission staff.

Emission Offsets for Particulate Matter Impact

Air Quality Table 20 summarizes PM10 and SOx offset requirements and identifies the sources of PM10 and SOx offsets proposed by NCPA. These offsets are held by NCPA and are being offered as mitigation for the PM10/PM2.5 impacts. NCPA proposes to use its holdings of PM10 and SOx ERCs through an interpollutant trade to satisfy the District offset requirements for PM10.

AIR QUALITY Table 20
LEC, PM10 and SOx Offset Holdings and Quarterly Offset Requirements (lb/qtr)

Name of Offset / Site of Reduction	ERC Number	Q1 (lb/qtr)	Q2 (lb/qtr)	Q3 (lb/qtr)	Q4 (lb/qtr)
PM10 Offsets Held by NCPA					
Shutdown of feedmill, Tulare	S-2844-4	5,830	5,830	4,500	9,830
Shutdown of Cotton Gin, Raisin City	C-911-4	0	0	0	4,244
3200 E Eight Mile Road, Stockton	N-756-4	81	78	583	58
Shutdown of boilers, Auberry, Fresno County	C-913-4	10	45	0	28
Shutdown of oil fired boilers, North Fork, Madera County	C-912-4	60	0	8	5
Surplus SOx ERCs (to offset PM10)	(below)	18,047	16,367	43,672	18,062
PM10 Mitigation Total	---	**24,029**	**22,321**	**48,764**	**32,228**
Quarterly PM10 Emissions	---	**21,728**	**21,944**	**22,160**	**22,160**
PM10 Fully Offset?	---	Yes	Yes	Yes	Yes
SOx Offsets Held by NCPA					
Tulare	S-2843-5	13,298	10,631	12,619	13,452
Tulare	S-2845-5	7,998	9,131	7,319	8,152
Bakersfield	S-2858-5	9,100	9,100	9,080	9,100
4000 Yosemite Blvd, Modesto	N-759-5	0	0	12,651	0
Merced	N-758-5	0	0	11,045	0
Bakersfield	S-2846-5	931	931	931	931
Merced	N-757-5	0	0	3,600	0
SOx Mitigation Total	---	**31,327**	**29,793**	**57,245**	**31,635**
Quarterly SOx Emissions	---	**13,280**	**13,426**	**13,573**	**13,573**
SOx Fully Offset?	---	Yes	Yes	Yes	Yes

Source: Quarterly Emissions do not total the LEC Potential to Emit because of differences in the applicant's quarterly operating profile (CH2M2009c) and the annual operating profile (NCPA2009b). Quantities shown here are subject to revision after release of SJVAPCD Determination of Compliance.

The applicant proposes to use reductions of SOx to offset PM10/PM2.5 increases associated with the project. The District allows this by establishing an interpollutant offset ratio (District Rule 2201, Section 4.13.3). SOx is accepted as one of the major precursors of PM10 and PM2.5 through reaction with ammonia to form ammonium sulfates. Reductions in SOx, particularly in areas that are ammonia rich such as the San Joaquin Valley, can reduce secondary particulate formation. However, the key issue is the determining the appropriate interpollutant offset ratio, which depends on the existing levels of particulate matter precursors and the general atmospheric chemistry of the area in question. The SJVAPCD conducted a district-wide analysis in March 2009 (SJVAPCD2009a), and the district-wide analysis concluded that a one-to-one interpollutant ratio would be protective of managing regional PM10/PM2.5 impacts and progress towards attainment. However, the District's use of a one-to-one interpollutant ratio for Rule 2201 compliance leads to fewer SOx reductions for particulate matter than ratios used by SJVAPCD in some past cases. This issue is discussed further in **AIR QUALITY CUMULATIVE IMPACTS**.

LEC appears to be in compliance with the District's PM10 and SOx offset requirements and, due to the distance ratio of 1.5, LEC would provide PM10/PM2.5 precursor ERCs at an offset ratio of greater than one-to-one for the emissions over the SJVAPCD offset threshold.

Adequacy of Proposed Mitigation

Energy Commission staff have long held that emission reductions need to be provided for all nonattainment pollutants and their precursors at a minimum overall one-to-one ratio of annual operating emissions. For this project, a staff-recommended Condition of Certification (**AQ-SC7**) and the District's offset requirements ensure that LEC would meet or exceed that minimum offsetting goal for all ozone and particulate matter impacts.

The offsets shown in **Air Quality Table 19** and **Table 20** demonstrate that NCPA owns ERCs in sufficient quantities to offset the project's NOx, VOC, PM10, and SOx emissions, per District requirements and Energy Commission staff policy. Although PM2.5 emissions are not required to be offset separately from PM10 emissions, staff notes that the annual total offsets for PM10 and SOx would fully offset PM2.5 emissions (Response to DR62, CH2MHILL2009g). How the offsets provide PM2.5 mitigation is discussed separately in **AIR QUALITY SECONDARY POLLUTANT IMPACTS**.

While the District has proposed a one-to-one interpollutant offset ratio for SOx and PM10 that is lower than what has been historically required by the District on other cases, Energy Commission staff's long-standing position is that all nonattainment pollutant and precursor emissions must be offset by at least one-to-one. Therefore, the proposed emission offset package would mitigate all project air quality impacts to a less than significant level.

Staff's review of the offset package was determined solely based on the merits of this case, including the District offset requirements, the project's emission limits, the specific ERCs proposed, and ambient air quality considerations of the region, and does not in any way provide a precedence or obligation for the acceptance of offset proposals for any other current or future licensing cases.

Staff Proposed Mitigation

Staff proposes Conditions of Certification **AQ-SC6** to ensure that the license is amended as necessary to incorporate future changes to the air quality permits and to ensure ongoing compliance during commissioning and routine operation through quarterly reports (**AQ-SC8**). Staff also proposes a Condition of Certification (**AQ-SC7**) to ensure that significant impacts of ozone and PM10/PM2.5 precursors would be mitigated with SJVAPCD offsets.

Cumulative Impacts and Mitigation

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

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

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

- A summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution;
- An analysis of the project's "localized cumulative impacts" direct emissions locally when combined with other local major emission sources; and
- A discussion of greenhouse gas emissions and global climate change impacts (in **AIR QUALITY APPENDIX AIR-1**).

Summary of Projections

The federal and California Clean Air Acts direct local air quality management agencies to implement plans and programs that lead to attainment and maintenance of the ambient air quality standards. The New Source Review program administered by SJVAPCD and other programs for reducing emissions from mobile sources or area-wide sources are part of air quality management plans.

Ozone

- The **2004 Extreme Ozone Attainment Demonstration Plan** illustrates how the SJVAPCD would attain the federal 1-hour ozone standard that was revoked in 2005. This plan includes elements that are the foundation for later ozone plans.

- The **2007 Ozone Plan** to attain the federal 8-hour ozone standard was approved by ARB on June 14, 2007. This plan would reduce ozone and particulate matter levels in the region, primarily by achieving a 75% reduction in NOx emissions by 2023. Achieving such dramatic reductions would affect all sectors of the region's economy (SJVAPCD 2007). The plan relies on four main approaches: tighter district regulations for stationary sources, wider use of incentive-based measures (like the Carl Moyer Program) to accelerate deployment of cleaner sources, new "innovative" programs for trip-reduction and energy conservation, and expanded controls on mobile source tailpipe emissions.

The proposed LEC project is subject to the current SJVAPCD rules and regulations that specify performance standards, offset requirements, and emission control requirements for stationary sources. The regulations also include requirements for obtaining Authority to Construct (ATC) permits and subsequent operating permits. These regulations apply to LEC and all other projects with emission sources. In general, triennial updates of the attainment plans ensure that population, employment, and transportation trends in the region are taken into account, and compliance with SJVAPCD rules and regulations ensures consistency with the regional air quality management plans. The SJVAPCD made a preliminary determination of how the originally-proposed equipment would comply with the offset requirements and other District rules, and that the originally-proposed LEC project would comply with recently adopted plans and the changing regulatory environment (SJVAPCD2009a). Because the project would control ozone precursor emissions and use ERCs to fully offset ozone precursors as required by existing rules and regulations, the project would not be likely to conflict with the District's 2007 Ozone Plan or regional ozone attainment goals.

Particulate Matter

- The **2007 PM10 Maintenance Plan** illustrates how the SJVAPCD intends to continue the efforts of the **2003 PM10 Plan** and **2006 PM10 Plan** that implemented aggressive PM10 controls in the region, including Reasonably Available Control Measures (RACM) for large existing sources of PM10 and fugitive dust. The 2007 PM10 Maintenance Plan includes a request for reclassification to "attainment" for the federal PM10 standard, and it provides for continued attainment for 10 year from the designation. In November 2008, the U.S. EPA redesignated the SJVAPCD to attainment for the federal PM10 standard (73 FR 66759, November 12, 2008).
- The **2008 PM2.5 Plan** was adopted by the SJVAPCD Governing Board on April 30, 2008, and it includes measures for attaining the 1997 and 2006 federal PM2.5 standards. The 2008 PM2.5 Plan shows that emission reductions of NOx, directly emitted PM2.5, and SO_2 are needed to demonstrate attainment of the PM2.5 NAAQS in the San Joaquin Valley (p. 6-1 of plan).

Energy Commission staff is concerned that the proposed LEC project could interfere with the attainment effort of the 2008 PM2.5 Plan if it relies on SOx emission reduction credits without an adequate trading ratio for allowing PM2.5 increases. Interpollutant trading is allowed with "the appropriate scientific demonstration of an adequate trading ratio" (Rule 2201, Section 4.13), and the SJVAPCD 2007 PM10 Maintenance Plan (see Appendix E of the Maintenance Plan) indicates that the minimum ratio would be one-to-one with higher interpollutant ratios if appropriate under Rule 2201. The one-to-one ratio

was developed by the SJVAPCD based on modeling conducted in support of the 2008 PM2.5 Plan, but although implementation of trading under District Rule 2201 is subject to federal oversight, there is no evidence in the record indicating whether the methods used by the District in developing the ratio have been specifically reviewed and/or approved by U.S. Environmental Protection Agency (CEC 2009, USEPA 2009).

The U.S. EPA review of the District's 2008 PM2.5 Plan is ongoing, and the review may lead to a different conclusion on an appropriate interpollutant trading ratio for the SJVAPCD. In rules issued by the U.S. EPA in 2008 related to PM2.5 NSR, the U.S. EPA's "nationwide preferred ratio" would be 40-to-1 for SO2-to-PM2.5 (73 FR 28339; May 16, 2008). Those rules are currently subject to a reconsideration established by U.S. EPA on April 24, 2009, so the ultimate outcome is uncertain. Although there is no formal federal endorsement of the District's interpollutant trading approach, Energy Commission staff is able to conclude that the LEC project would not be likely to conflict with regional particulate matter attainment goals. Staff recognizes that the attainment plan has been previously adopted by ARB, and the SJVAPCD made a preliminary determination that the interpollutant trading ratio is appropriate (SJVAPCD2009a). The SJVAPCD shows that LEC is likely to comply with the particulate matter plans by meeting its permit requirements and complying with the existing applicable rules and regulations.

Localized Cumulative Impacts

The proposed project and other reasonably foreseeable projects could cause impacts that would be locally combined if present and future projects would introduce stationary sources that are not included in the "background" conditions. Reasonably foreseeable future projects are those that are either currently under construction or in the process of being approved by a local air district or municipality. Projects that have not yet entered the approval process do not normally qualify as "foreseeable" since the detailed information needed to conduct this analysis is not available. Sources that are presently operational are included in the background concentrations. Background conditions also take into account the effects of non-stationary sources.

Projects with stationary sources located up to six miles from the proposed project site usually need to be considered by the analysis. NCPA requested that the SJVAPCD identify potential new stationary sources within six miles of the Lodi Energy Center. The SJVAPCD reported two facilities with pending foreseeable changes, potentially involving emissions increases of more than 10 pounds per day of a contaminant other than VOC. Although cumulative sources emitting exclusively VOC would contribute to the project-related impacts to secondary ozone formation, these impacts are not modeled in this Staff Assessment because there are no agency-recommended models or procedures for quantifying the cumulative ozone impacts.

In May 2009, Energy Commission staff requested that SJVAPCD update its survey of the foreseeable projects, and six facilities were identified. However, only three projects would involve modifications resulting in potentially increased emissions of more than 10 pounds per day of any contaminant other than VOC. The NCPA cumulative analysis considers the existing NCPA STIG (AFC Appendix 5.1G, CH2M2009c), and the SJVAPCD response to staff on foreseeable sources identified the following facilities and stationary sources:

- **Existing NCPA STIG.** The existing STIG, adjacent to the proposed LEC, would not experience any foreseeable change as a result of the LEC (Response to DR60, CH2M2009g), nor is any change to the existing STIG proposed. The existing stationary sources related to the STIG are included in NCPA's analysis of cumulative impacts, results shown in **Air Quality Table 21**.
- **Facility #N-19.** Proposed natural gas-fired boiler (9900 Lower Sacramento Road, Stockton) would be minor and exempt from permitting requirements and would not involve more than 10 pounds per day of nonattainment pollutants or precursors. This source is not included in the cumulative analysis because it would result in exempt emissions of CO that would not be likely to cause or contribute to nonattainment.
- **Facility #N-5695.** Proposed dairy digester gas-fired internal combustion engine (401 W. Armstrong Road, Lodi). This source is not included in the cumulative analysis because it would replace two existing engines at the facility, resulting in no net emission increase.
- **Facility #N-7763.** Proposed diesel-fueled emergency standby internal combustion engine (8407 Kelley Drive, Stockton). This source is not included in the cumulative analysis because it would only operate intermittently, under emergency conditions, and fewer than 50 hours per year for testing purposes.

The maximum modeled cumulative impacts are presented below in **Air Quality Table 21**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels.

Air Quality Table 21
LEC, Ambient Air Quality Impacts from Cumulative Sources (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	9.1	**104.5**	**113.6**	50	**227**
	Annual	0.6	**33.4**	**34.0**	20	**170**
PM2.5	24 hour	9.1	**81.2**	**90.3**	35	**258**
	Annual	0.6	**14.4**	**15.0**	12	**125**
CO	1 hour	340	5,500	5,840	23,000	25
	8 hour	112	2,640	2,752	10,000	28
NO_2	1 hour [a]	144.2	147	291.2	339	86
	Annual	0.7	34	34.7	57	61
SO_2	1 hour	3.9	46.9	50.8	655	8
	24 hour	1.5	18.3	19.8	105	19
	Annual	0.2	5.2	5.4	80	7

Source: AFC Appendix 5.1G, Table 5.1G-4R (CH2M2009c). Short-term impacts include existing NCPA STIG fire pump engine testing. Modeled impact without fire pump engine testing is under 6.0 µg/m^3 for PM10 24-hour.
Notes: a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

Compared with the impacts from the proposed LEC project alone, maximum cumulative impacts caused by the existing NCPA STIG would be substantially higher for PM10/PM2.5 and for NO_2. The combined PM10/PM2.5 and NO_2 impacts caused by LEC and the existing NCPA STIG would be dominated by STIG due to the lower release heights of the existing STIG and fire pump engine stacks.

Staff believes that particulate matter emissions from LEC would be cumulatively considerable because they would contribute to existing violations of the PM10 and PM2.5 ambient air quality standards. Secondary impacts would also be cumulatively considerable for PM10, PM2.5, and ozone because emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would contribute to existing violations of the PM10, PM2.5, and ozone standards. To address the contribution caused by LEC to cumulative particulate matter and ozone impacts, the mitigation would offset all nonattainment pollutants and their precursors at a minimum ratio of one-to-one.

COMPLIANCE WITH LORS

The SJVAPCD released a Preliminary Determination of Compliance (PDOC) for LEC using a General Electric combustion turbine, the originally-proposed equipment, on April 15, 2009 (SJVAPCD2009a). Compliance of that equipment with all District Rules and Regulations was demonstrated to the District's satisfaction in the initial PDOC. The District's preliminary conditions are presented in the Conditions of Certification of this staff assessment, edited to reflect the currently-proposed Siemens CTG. Energy Commission staff and the U.S. EPA provided comments on the initial PDOC to the District for their consideration (CEC 2009, USEPA 2009). This Staff Assessment is

subject to revision to include the District's final conditions for the Siemens CTG and any substantive revisions or responses from the District brought about by the U.S. EPA or Energy Commission staff comments.

FEDERAL

The Determination of Compliance would represent the preliminary federal New Source Review (NSR) permit.

40 CFR 52.21, Prevention of Significant Deterioration

The applicant has withdrawn its application to the U.S. EPA for a preliminary Prevention of Significant Deterioration (PSD) permit (NCPA2009b). The PSD program would not apply, as long as the LEC project is subject to federally-enforceable operating limitations, which would need to originate in the District's Determination of Compliance. The District expects to release in November 2009 a Determination of Compliance for the currently-proposed Siemens equipment that establishes limits to avoid applicability of PSD. To ensure that LEC amends the Energy Commission license as necessary to incorporate changes triggered by District or U.S. EPA action related to PSD, if any, staff proposes Condition of Certification **AQ-SC6**.

40 CFR 60, NSPS Subpart KKKK

The CTG and HRSG proposed for LEC would be likely to comply with the applicable emission limits by achieving a NOx emission rate of 2.0 ppmvd over any one-hour period except during startup and shutdown periods and during combustor tuning.

STATE

LEC has demonstrated that the project would comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury. Compliance with the District's and the Energy Commission staff's Conditions of Certification would enable staff's affirmative finding.

LOCAL

The District issued a PDOC for the originally-proposed General Electric combustion turbine (SJVAPCD2009a) stating that the proposed project is expected to comply with all applicable District rules and regulations. Until the District issues a Determination of Compliance with conditions applicable to the currently-proposed Siemens CTG, staff cannot conclude whether the Lodi Energy Center would be likely to comply with District rules and regulations.

The District rules and regulations specify the emissions control and offset requirements for the new sources associated with the Lodi Energy Center. The SJVAPCD determined that the originally-proposed project would use the Best Available Control Technology (BACT), and the emission reduction credits (ERCs) approved and certified by the District would fully offset project nonattainment pollutant (including precursors) emissions so that they would be consistent with District rules and regulations. The results of the SJVAPCD's updated review of the currently-proposed Siemens CTG need to be released before any conclusions can be drawn about the project being consistent with District rules and regulations.

Staff and U.S. EPA identified concerns on whether the ERCs would be exchanged with an interpollutant ratio that is consistent with U.S. EPA recommendations (USEPA 2009), as discussed under **AIR QUALITY CUMULATIVE IMPACTS**. The other issues that were identified by staff upon review of the initial PDOC are discussed below (CEC 2009).

Rule 2201, New Source Review and BACT

Staff recommends that the District provide more information in its analysis of Best Available Control Technologies (BACT, on PDOC pp. 26-28) to include information on minimizing startup emissions or startup durations. Energy Commission staff recognizes that the proposed combustion turbine for the Lodi Energy Center would use a rapid startup technology to minimize startup emissions and durations, but the PDOC analysis does not consider whether this would qualify as a suitable "control technology" for startups.

Staff also recommended that the District consider the Final Determination of Compliance that was issued for the Avenal Power Center on October 30, 2008 (08-AFC-01, Project No. C-1080386) and that the BACT determination be revised for CO from the CTG and HRSG to be limited to no more than 2.0 parts per million (ppm) on a 3-hour basis (Attachment F-5 of the Avenal FDOC). The applicant subsequently filed information indicating that LEC would achieve 2.0 ppm CO (NCPA2009b).

SJVAPCD Rule 4703, Stationary Gas Turbines

Staff has a number of concerns regarding the preliminary compliance determination for District Rule 4703 (PDOC pp. 73 to 81). The District claims that vendor information indicates startups would potentially exceed the two-hour limit in District Rule 4703, Section 5.3.1.1, but no vendor information on startups was provided to the Energy Commission by NCPA. Projects similar to LEC would meet much more stringent startup limitations than the six hours originally proposed by LEC. No more than 110 minutes would be allowed for startup of the Victorville 2 Hybrid Power Project (07-AFC-1, Final Commission Decision, July 2008, CEC-800-2008-003-CMF) and the Palmdale Hybrid Power Plant (08-AFC-9, currently under review). The applicant subsequently updated its proposal to keep startups under three hours (NCPA2009b), but this would still be over the duration specified by Rule 4703. Staff seeks more information from SJVAPCD or the applicant demonstrating whether the LEC would be able to comply with the two hour startup limit in this rule. Staff also recommends incorporating a condition that was proposed by NCPA (CH2M2009c) requiring reassessment of LEC startup capabilities after 12 months of normal operation (**AQ-SC10**).

Additionally, it is not clear whether combustor tuning periods (Response to DR64, CH2M2009g) would be compliant with emission limits in Rule 4703 or the federal New Source Performance Standard (40 CFR 60, NSPS Subpart KKKK). Combustor tuning periods described above were requested by NCPA part-way through the SJVAPCD's review process, and this mode of operation does not appear to be allowed or explicitly considered as part of the District PDOC.

CONCLUSIONS

- Construction impacts would contribute to violations of the ozone, PM10, and PM2.5 ambient air quality standards. Staff recommends Conditions of Certification **AQ-SC1** to **AQ-SC5** to mitigate the project construction-phase impacts to a less than significant level.
- Staff cannot determine whether operation of the Lodi Energy Center project would comply with applicable SJVAPCD rules and regulations, including New Source Review, Best Available Control Technology (BACT) requirements, performance standards for stationary gas turbines in startup and tuning modes, and requirements to offset emission increases. In order to determine conformance with applicable federal, state, and SJVAPCD LORS, staff must have the results of the SJVAPCD review of the Siemens CTG that the applicant proposed in July 2009. Staff expects the SJVAPCD to release the review in November 2009, therefore this Staff Assessment is subject to revision to include the District's final conditions.
- The project would neither cause new violations of any NO_2, CO, or SO_2 ambient air quality standards nor contribute to existing violations for these pollutants. Therefore, the project's direct NO_2, CO, and SO_2 impacts are less than significant.
- The project NOx and VOC emissions would contribute to existing violations of state and federal ozone ambient air quality standards. The ozone precursor offsets required by SJVAPCD and shown in Condition of Certification **AQ-SC7** would mitigate the ozone impact to a less than significant level.
- Without proper mitigation, the project PM10 and PM2.5 emissions and the PM10/PM2.5 precursor emissions of SOx would contribute to the existing violations of state and federal PM10 and PM2.5 ambient air quality standards. ERCs would be accepted for PM10 and SOx reductions (**AQ-SC7**), and these ERCs would mitigate the PM10/PM2.5 impacts to a less than significant level. The particulate matter precursor offsets would satisfy Energy Commission staff's long-standing position that all nonattainment pollutant and precursor emissions be offset at least one-to-one. Future projects may be subject to different offset ratios because the U.S. EPA review of the SJVAPCD's 2008 PM2.5 Plan is ongoing, and there is no evidence that the District's interpollutant trading ratios have been specifically reviewed and/or approved by U.S. EPA (see **AIR QUALITY CUMULATIVE IMPACTS**).
- Staff recommends Condition of Certification **AQ-SC9** to limit ammonia slip from the combined-cycle system to the extent feasible.
- Staff recommends requiring reassessment of LEC startup capabilities after 12 months of normal operation (**AQ-SC10**).
- Global climate change and greenhouse gas (GHG) emissions from the project are analyzed in **Air Quality Appendix AIR-1**. The LEC would be able to comply with the requirements of SB 1368 and the Emission Performance Standard. The project would be subject the Air Resources Board mandatory GHG reporting requirements and any GHG reduction or trading requirements developed by the ARB as GHG regulations are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

STAFF-RECOMMENDED CONDITIONS OF CERTIFICATION

Staff proposes the following conditions of certification (identified as the **AQ-SCx** series of conditions) to provide mitigation during the construction phase of the project.

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

Verification: At least 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 all AQCMM delegates. The AQCMM and all delegates must be approved by the CPM before the start of ground disturbance.

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

Verification: At least 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. The AQCMP must be approved by the CPM before the start of ground disturbance.

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

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

B. No vehicle shall exceed 15 miles per hour within the construction site.

C. Visible speed limit signs shall be posted at the construction site entrances.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

B. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at

least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and either a Tier 1 engine or the highest level of available control is being used; or

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

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

C. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and the AQCMM demonstrates that one of the following conditions exists:

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

2. The control device is causing or is reasonably expected to cause significant engine damage.

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

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

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

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

F. Construction equipment will employ electric motors when feasible.

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

AQ-SC6 The project owner shall 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-SC7 The project owner shall provide emission reductions in the form of offsets or emission reduction credits (ERCs) to offset at least 142,569 lb NOx, 33,133 lb VOC, 88,117 lb PM10, and 53,848 lb SOx emissions. The project owner shall demonstrate that the reductions are provided in the form required by the District.

The project owner shall surrender the ERCs from among those that are listed in the District Preliminary Determination of Compliance Conditions (SJVAPCD 2009a) or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an updated table including the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions to the listed credits.

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

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

AQ-SC8 The project owner shall submit to the CPM quarterly operation reports that include operational and emissions information as necessary to demonstrate compliance with the conditions of certification. The quarterly operation report shall specifically note or highlight incidences of noncompliance.

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

AQ-SC9 The ammonia (NH_3) emissions from the combustion turbine (N-2697-5) shall not exceed 10 ppmvd @ 15% O_2 averaged over one hour. The selective catalytic reduction (SCR) system catalyst shall be replaced, repaired, or otherwise reconditioned within 12 months if the ammonia slip exceeds 5 ppmvd @ 15% O_2 over a 24 hour rolling average. The SCR ammonia injection grid replacement, repair, or reconditioning scheduled event may be cancelled if the owner or operator can demonstrate that, subsequent to the initial exceedance, the ammonia slip consistently remains below 5 ppmvd @ 15% O_2 averaged over 24 hours, and that the initial exceedance does not accurately indicate expected future operating conditions.

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-SC10 The project owner shall maintain continuous emissions monitoring (CEM) data and complete records of plant NOx and CO emissions performance under startup conditions. The project owner/operator shall record the minute-by-minute NOx and CO emissions concentrations and turbine load and the duration of each startup that occurs during the first 12 months of operation following the end of the commissioning period. Within 15 months of the end of the commissioning period, the project owner/operator shall propose and submit to the CPM, the District, and U.S. EPA new time limits for cold, warm, and hot gas turbine start-ups that reflect the effect of rapid start technology. The proposal shall be based on continuous emissions data for NOx and CO collected during gas turbine startup periods during the first 12 months of operation following the end of the commissioning period. The submittal shall include all CEMS data collected.

Verification: A review of startup time limits and recommendations for new limits shall be provided to the CPM and APCO within 15 months of the end of the commissioning period.

PRELIMINARY DISTRICT CONDITIONS

The SJVACPD expects to release in November 2009 a Determination of Compliance for the currently-proposed Siemens equipment. The following are preliminary conditions (derived from SJVAPCD2009a with modifications to reflect the currently-proposed equipment) for the combined-cycle system combustion turbine (**AQ-1** to **AQ-69**) and facility-wide conditions (**AQ-70** to **AQ-90**), followed by the conditions for the cooling tower (**AQ-91** to **AQ-103**), and the auxiliary boiler (**AQ-104** to **AQ-146**). This Staff Assessment is subject to revision to include the District's final conditions for the Siemens CTG and any substantive revisions or responses from the District brought about by the U.S. EPA or Energy Commission staff comments, after they are released by the District.

EQUIPMENT DESCRIPTION, UNIT N-2697-5-0

294 MW (NOMINAL) COMBINED-CYCLE ELECTRIC GENERATION PLANT CONSISTING OF A SIEMENS INDUSTRIAL FRAME "FLEX PLANT 30" STG6-5000F (OR EQUIVALENT) NATURAL GAS-FIRED TURBINE ENGINE WITH DRY LOW-NO_X COMBUSTORS, AN UNFIRED HEAT RECOVERY STEAM GENERATOR SERVED BY A SELECTIVE CATALYTIC REDUCTION WITH AMMONIA INJECTION AND AN OXIDIZATION CATALYST AND A STEAM TURBINE GENERATOR

AQ-1 The permittee shall not begin actual on-site construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-2 The permittee shall submit an application to comply with SJVUAPCD District Rule 2540 - Acid Rain Program. [District Rule 2540]

Verification: The project owner shall submit to both the District and CPM the Acid Rain Program application after completing commissioning.

AQ-3 This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District NSR Rule]

Verification: No verification necessary.

AQ-4 Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

Verification: The project owner shall submit to both the District and CPM the Title V Operating Permit application prior to operation.

AQ-5 The owner or operator shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-6 The District shall be notified in writing within ten 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. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-7 No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-8 Particulate matter emissions from the gas turbine system shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Verification: The project owner shall submit the results of source tests to both the District and CPM in accordance with **AQ-38**.

AQ-9 No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-10 APCO or an authorized representative shall be allowed to inspect, as determined to be necessary, the required monitoring devices to ensure that such devices are functioning properly. [District Rule 1080]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-11 Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to ensure safe and reliable steady state operation of the gas turbine and associated electrical delivery systems. [District Rule 2201]

Verification: No verification necessary.

AQ-12 Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when a gas turbine is first fired, whichever occurs first. The commissioning period shall terminate when the plant has completed initial source testing, completed final plant tuning, and is available for commercial operation. [District Rule 2201]

Verification: The project owner shall submit a commissioning plan to the CPM and APCO for approval at least 30 days prior to first firing of the gas turbine describing the procedures to be followed during the commissioning period and the anticipated duration of each commissioning activity.

AQ-13 During the commissioning period, emission rates from the gas turbine system shall not exceed any of the following limits: NOx (as NO2) - 400.00 lb/hr and 4,000 lb/day; VOC (as CH4) - 16.00 lb/hr and 192.0 lb/day; CO - 2,000 lb/hr

and 20,000 lb/day; PM10 - 9.00 lb/hr and 108.0 lb/day; or SOx (as SO2) - 6.10 lb/hr and 73.1 lb/day. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-14 During commissioning period, NOx and CO emission rate shall be monitored using installed and calibrated CEMS. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-12**.

AQ-15 The total mass emissions of NOx, VOC, CO, PM10 and SOx that are emitted during the commissioning period shall accrue towards the quarterly emission limits. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-16 During commissioning period, the owner or operator shall keep records of the natural gas fuel combusted in the gas turbine system on hourly and daily basis. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-17 The duration of startup or shutdown period shall not exceed 3.0 hours per event for any type of startup event (hot, warm, or cold). [District Rules 2201 and 4703]

Verification: The project owner shall submit to the District and CPM the startup and shutdown event duration data demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-18 The combined startup and shutdown duration for all events shall not exceed 6.0 hours during any one day. [District Rule 2201]

Verification: The project owner shall submit to the District and CPM the startup and shutdown event duration data demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-19 The owner/operator shall maintain records of the date, start-up time, downtime for gas turbine and the steam turbine prior to startup, startup type, minute-by-minute turbine load (MW), and NOx and CO concentrations (ppmvd @ 15% O2) measurement using CEMS, for each startup event in the first 12 months of operation following the end of the commissioning period. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-20 Within 15 months of the end of the commissioning period, the owner/operator shall submit to the District, the CARB and the EPA proposed new time limits for each type of startup that reflect the effect of "Flex Plant 30" fast start-up technology. The proposed time limits shall be based on the required data collected in the first 12 months of operation following the end of the commissioning period. The submittal must include all CEMS data. [District Rule 2201]

Verification: See Verification for **AQ-SC10**.

AQ-21 A margin of compliance of 60 minutes (or less) may be added to the longest startup to establish a startup limit for each type of startup event (hot, warm, or cold). The established startup limit shall not exceed 3.0 hours. [District Rule 2201]

Verification: See Verification for **AQ-SC10**.

AQ-22 The District shall administratively establish appropriate startup times for each startup mode (hot, warm, or cold), and associated recordkeeping requirements. [District Rule 2201]

Verification: See Verification for **AQ-SC10**.

AQ-23 During all types of operation, including startup (cold, warm and hot) and shutdown periods, ammonia injection into the SCR system shall occur once the minimum temperature at the catalyst face has been reached to ensure NOx emission reductions can occur with a reasonable level of ammonia slip. The minimum catalyst face temperature shall be determined during the final design phase of this project and shall be submitted to the District at least 30 days prior to commencement of construction. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-24 The District shall administratively add the minimum temperature limitation established pursuant to the above condition in the final Permit to Operate. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-25 The SCR system shall be equipped with a continuous temperature monitoring system to measure and record the temperature at the catalyst face. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-26 During start-up and shutdown periods, the emissions shall not exceed any of the following limits: NOx (as NO2) - 160.00 lb/hr; CO - 500.00 lb/hr; VOC (as methane) - 16.00 lb/hr; PM10 - 9.00 lb/hr; SOx (as SO2) - 6.10 lb/hr; or Ammonia (NH3) - 28.76 lb/hr. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-27 Start-up is defined as the period of time during which a unit is brought from a shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operation. [District Rule 4703, 3.29]

Verification: No verification necessary.

AQ-28 Shutdown is defined as the period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off. [District Rule 4703, 3.26]

Verification: The project owner shall submit to the District and CPM the startup and shutdown event duration data demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-29 The emission control systems shall be in operation and emissions shall be minimized insofar as technologically feasible during startup and shutdown. [District Rule 4703, 5.3.2]

Verification: The project owner shall submit to the District and CPM the startup and shutdown event duration data demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-30 Except during startup and shutdown periods, emissions from the gas turbine system shall not exceed any of the following limits: NOx (as NO2) - 15.54 lb/hr and 2.0 ppmvd @ 15% O2; CO – 9.46 lb/hr and 2.0 ppmvd @ 15% O2; VOC (as methane) - 3.79 lb/hr and 1.4 ppmvd @ 15% O2; PM10 - 9.00 lb/hr; or SOx (as SO2) - 6.10 lb/hr. NOx (as NO2) emission limits are based on 1-hour rolling average period. All other emission limits are based on 3-hour rolling average period. [District Rules 2201, 4001 and 4703]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-31 NH3 emissions shall not exceed any of the following limits: 10.0 ppmvd @ 15% O2 over a 24-hour rolling average period, and 28.76 lb/hr while gas turbine system operates. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-32 Each 3-hour rolling average period will be compiled from the three most recent one hour periods. Each one hour period shall commence on the hour. Each one hour period in a twenty-four hour average for ammonia slip will

commence on the hour. The twenty-four hour average will be calculated using the most recent twenty-four one-hour periods. [District Rule 2201]

Verification: No verification necessary.

AQ-33 Emissions from the gas turbine system, on days when a startup and/or shutdown occurs, shall not exceed the following limits: NOx (as NO2) - 879.7 lb/day; CO - 3,170.3 lb/day; VOC - 164.2 lb/day; PM10 - 216.0 lb/day; SOx (as SO2) - 146.4 lb/day, or NH3 - 690.2 lb/day. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-34 Emissions from the gas turbine system, on days when a startup and/or shutdown does not occur, shall not exceed the following: NOX (as NO2) - 373.0 lb/day; CO - 227.0 lb/day; VOC - 91.0 lb/day; PM10 - 216.0 lb/day; SOX (as SO2) - 146.4 lb/day, or NH3 - 690.2 lb/day. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-35 Gas turbine system shall be fired on PUC-regulated natural gas with a sulfur content of no greater than 1.0 grain of sulfur compounds (as S) per 100 dscf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-36 Daily emissions will be compiled for a twenty-four hour period starting and ending at twelve-midnight. [District Rule 2201]

Verification: No verification necessary.

AQ-37 NOx (as NO2) emissions from the gas turbine system shall not exceed any of the following: 1st quarter: 38,038 lb; 2nd quarter: 38,411 lb; 3rd quarter: 37,126 lb; 4th quarter: 37,840 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-38 CO emissions from the gas turbine system shall not exceed any of the following: 1st quarter: 49,500 lb; 2nd quarter: 49,500 lb; 3rd quarter: 49,500 lb; 4th quarter: 49,500 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-39 VOC emissions from the gas turbine system shall not exceed any of the following: 1st quarter: 8,086 lb; 2nd quarter: 8,177 lb; 3rd quarter: 8,417 lb; 4th quarter: 8,323 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-40 NH3 emissions from the SCR system shall not exceed any of the following: 1st quarter: 62,122 lb; 2nd quarter: 62,812 lb; 3rd quarter: 63,502 lb; 4th quarter: 63,502 lb. [District Rule]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-41 PM10 emissions from the gas turbine system shall not exceed any of the following: 1st quarter: 19,440 lb; 2nd quarter: 19,656 lb; 3rd quarter: 19,872 lb; 4th quarter: 19,872 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-42 SOx (as SO2) emissions from the gas turbine system shall not exceed any of the following: 1st quarter: 13,176 lb; 2nd quarter: 13,322 lb; 3rd quarter: 13,469 lb; 4th quarter: 13,469 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-43 The total CO emissions from the gas turbine system (N-2697-5) and the auxiliary boiler (N-2697-7) shall not exceed 198,000 pounds in any 12-consecutive month rolling period. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-44 A selective catalytic reduction (SCR) system and an oxidation catalyst shall serve the gas turbine system. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-45 The gas turbine engine and generator lube oil vents shall be equipped with mist eliminators or equivalent technology sufficient to limit the visible emissions from the lube oil vents to not exceed 5% opacity, except for a period not exceeding three minutes in any one hour. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-46 Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

Verification: The project owner shall submit the proposed source test plan or protocol for the source tests 15 days prior to the proposed source test date to both the District and CPM for approval. The project owner shall notify the District and CPM no later than 30 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the District and CPM.

AQ-47 Source testing shall be witnessed or authorized by District personnel and samples shall be collected by a California Air Resources Board (CARB) certified testing laboratory or a CARB certified source testing firm. [District Rule 1081]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-46**.

AQ-48 Source testing to measure start-up emission rates of NOx, CO and VOC shall be conducted before the end of commissioning period and at least once every seven years thereafter. CEM relative accuracy for NOx and CO shall be determined during startup and shutdown source testing in accordance with 40 CFR 60, Appendix F (Relative Accuracy Audit). If CEM data is not certifiable to determine compliance with NOX and CO startup emission limits, then startup and shutdown NOx and CO testing shall be conducted every 12 months. If an annual startup and shutdown NOx and CO relative accuracy audit demonstrates that the CEM data is certifiable, the startup and shutdown NOx and CO testing frequency shall return to the once every seven years schedule. [District Rule 1081]

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-46**). Testing for startup and shutdown emissions shall be conducted upon initial operation and at least once every seven years.

AQ-49 Source testing to determine compliance with the NOx, CO, VOC, and NH3 emission rates (lb/hr and ppmvd @ 15% O2) and PM10 emission rate (lb/hr) shall be conducted within 60 days after the end of commissioning period and at least once every 12 months thereafter. [District Rules 2201 and 4703, 40 CFR 60.4400(a)]

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-46**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-50 The sulfur content of each fuel source shall be: (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract, or (ii) monitored within 60 days after the end of commissioning

period and weekly thereafter. If the sulfur content is less than or equal to 1.0 gr/100 dscf for eight consecutive weeks, then the monitoring frequency shall be every six months. If the result of any six month monitoring demonstrates that the fuel does not meet the fuel sulfur content limit, weekly monitoring shall resume until compliance is demonstrated for eight consecutive weeks. [District Rule 2201 and 40 CFR 60.4360, 60.4365(a) and 60.4370(c)]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-51 The following test methods shall be used: NOx - EPA Method 7E or 20 or CARB Method 100; CO - EPA Method 10 or 10B or CARB Method 100; VOC - EPA Method 18 or 25; PM10 - EPA Method 5 (front half and back half) or 201 and 202a; ammonia - BAAQMD ST-1B; and O2 - EPA Method 3, 3A, or 20 or CARB Method 100. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703, 40 CFR 60.4400(1)(i)]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-46**.

AQ-52 Fuel sulfur content shall be monitored using one of the following methods: ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [40 CFR 60.4415(a)(1)(i)]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-53 The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-46**.

AQ-54 A non-resettable, totalizing mass or volumetric fuel flow meter to measure the amount of natural gas combusted in the unit shall be installed, utilized and maintained. [District Rules 2201 and 4703]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-55 The owner or operator shall install, certify, maintain, operate, and quality-assure a continuous emission monitor system (CEMS) which continuously measures and records the exhaust gas NOx, CO, and O2 concentrations. Continuous emissions monitor(s) shall monitor emissions during all types of operation, including during startup and shutdown periods, provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be

replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080, 2201 and 4703, 40 CFR 60.4340(b)(1) and 40 CFR 60.4345(a)]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission to verify the continuous monitoring system is properly installed and operational.

AQ-56 The NOx and O2 CEMS shall be installed and certified in accordance with the requirements of 40 CFR Part 75. The CO CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 4A (PS 4A), or shall meet equivalent specifications established by mutual agreement of the District, the CARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-57 The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each 15-minute quadrant of the hour or shall meet equivalent specifications established by mutual agreement of the District, the CARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-58 The CEMS data shall be reduced to hourly averages as specified in §60.13(h) and in accordance with §60.4350, or by other methods deemed equivalent by mutual agreement with the District, the CARB, and the EPA. [District Rule 1080 and 40 CFR 60.4350]

Verification: The project owner shall submit to the CPM and APCO CEMS data reduced in compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-59 In accordance with 40 CFR Part 60, Appendix F, 5.1, each CEMS must be audited at least once each calendar quarter. CEMS audit is not required for the quarters in which both relative accuracy test audit (RATA) and source testing are performed. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-60 The owner or operator shall perform RATA for NOx, CO and O2 as specified by 40 CFR Part 60, Appendix F, 5.1.1, at least once every four calendar quarters. The permittee 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. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

AQ-61 Upon written notice from the District, the owner or operator shall provide a summary of the data obtained from the CEMS. This summary shall be in the form and the manner prescribed by the District. [District Rule 1080]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission upon request.

AQ-62 The facility shall install and maintain equipment, facilities, and systems compatible with the District's CEMS data polling software system and shall make CEMS data available to the District's automated polling system on a daily basis. Upon notice by the District that the facility's CEMS is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEMS data is sent to the District by a District-approved alternative method. [District Rule 1080]

Verification: The project owner shall provide a Continuous Emission Monitoring System (CEM) protocol for approval by the APCO and CPM at least 60 days prior to installation of the CEM. The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission upon request.

AQ-63 The owner or operator shall maintain the following records: the date, time and duration of any malfunction of the continuous monitoring equipment; dates of performance testing; dates of evaluations, calibrations, checks, and adjustments of the continuous monitoring equipment; date and time period which a continuous monitoring system or monitoring device was inoperative. [District Rules 1080 and 2201 and 40 CFR 60.8(d)]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-64 The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission upon request.

AQ-65 Monitor Downtime is defined as any unit operating hour in which the data for NOx, CO2 or O2 concentrations is either missing or invalid. [40 CFR 60.4380(b)(2)]

Verification: No verification necessary.

AQ-66 The owner or operator shall maintain records of the following items: 1) hourly and daily emissions, in pounds, for each pollutant listed in this permit on the days startup and or shutdown of the gas turbine system occurs, 2) hourly and daily emissions, in pounds, for each pollutant in this permit on the days startup and or shutdown of the gas turbine system does not occur, 3) quarterly emissions, in pounds, for each pollutant listed in this permit. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-67 The owner or operator shall maintain a stationary gas turbine system operating log that includes, on a daily basis, the actual local startup and stop time, length and reason for reduced load periods, total hours of operation, the type and quantity of fuel used, duration of start-up, duration of shutdown, date/time and duration of each primary re-ignition period. [District Rule 2201 and 4703, 6.26, 6.28, 6.2.11]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-68 The owner or operator shall maintain all records of required monitoring data and support information for a period of five years from the date of data entry and shall make such records available to the District upon request. [District Rules 2201 and 4703, 6.2.4]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-69 The owner or operator shall submit a written report of CEM operations for each calendar quarter to the District. The report is due on the 30th day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NOx emissions, nature and the cause of excess (if known), corrective actions taken and preventive measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period used to determine compliance with an 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; A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

Verification: The project owner shall submit to the District and CPM the report of CEM operations, emission data, and monitor downtime data in the quarterly operation report (**AQ-SC8**) that follows the definitions of this condition.

AQ-70 The owner or operator shall submit to the District information correlating the NOx control system operating parameters to the associated measured NOx output. The information must be sufficient to allow the District to determine compliance with the NOx emission limits of this permit when the CEMS is not operating properly. [District Rule 4703, 6.2.5]

Verification: The project owner shall submit to the District and CPM the report of CEM operations, emission data, and monitor downtime data in the quarterly operation report (**AQ-SC8**).

AQ-71 Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

Verification: A summary of significant construction activities and monitoring records required shall be included in the construction monthly compliance report (**AQ-SC3**).

AQ-72 An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or five acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

Verification: The Dust Control Plan shall be included within the Air Quality Construction Mitigation Plan and submitted to the District and CPM (**AQ-SC2**), and a summary of significant construction activities and monitoring records required shall be included in the construction monthly compliance report (**AQ-SC3**).

AQ-73 An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 or Rule 8011. [District Rules 8011 and 8021]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-74 Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-75 Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-76 Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-77 Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-78 On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with three axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-79 Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-80 Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet

that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031 and 8071]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-81 Prior to operating under ATCs N-2697-5-0 and N-2697-7-0, the permittee shall mitigate the following quantities of NOx: 1st quarter: 38,348 lb, 2nd quarter: 38,721 lb, 3rd quarter: 37,436 lb, and 4th quarter: 38,150 lb. Offsets shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/06). [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-82 NOx ERCs S-2857-2, S-2848-2, S-2849-2, S-2850-2, S-2851-2, S-2852-2, S-2854-2, S-2855-2, C-915-2, C-916-2, C-914-2, N-755-2, N-754-2, S-2894-2 and S-2895-2 (or a certificate split from any of these certificates) shall be used to supply the required NOx offsets, unless a revised offsetting proposal is received and approved by the District. Following the revisions, this Authority to Construct permit shall be re-issued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to re-issuance of this Authority to Construct permit. [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-83 Prior to operating under ATCs N-2697-5-0 and N-2697-7-0, the permittee shall mitigate the following quantities of VOC: 1st quarter: 8,240 lb, 2nd quarter: 8,331 lb, 3rd quarter: 8,571 lb, and 4th quarter: 8,477 lb. Offsets shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/06). [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-84 VOC ERC S-2860-1, and NOx ERCs S-2857-2, S-2848-2, S-2849-2, S-2850-2, S-2851-2, S-2852-2, S-2854-2, S-2855-2, C-915-2, C-916-2, C-914-2, N-755-2, N-754-2, S-2894-2 and S-2895-2 (or a certificate split from any of these certificates) shall be used to supply the required VOC offsets, unless a revised offsetting proposal is received and approved by the District. Following the revisions, this Authority to Construct permit shall be re-issued, administratively specifying the new offsetting proposal. Original public noticing

requirements, if any, shall be duplicated prior to re-issuance of this Authority to Construct permit. [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-85 The District has authorized to use NOx reductions to overcome shortfall in the amount of VOC offsets at NOx/VOC interpollutant offset ratio of 1.00. [District Rule 2201]

Verification: No verification necessary.

AQ-86 Prior to operating under ATCs N-2697-5-0 and N-2697-7-0, the permittee shall mitigate the following quantities of SOx: 1st quarter: 2,668 lb, 2nd quarter: 2,668 lb, 3rd quarter: 2,668 lb, and 4th quarter: 2,668 lb. Offsets shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/06). [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-87 SOx ERCs S-2843-5, S-2845-5, S-2858-5, N-759-5, N-758-5, S-2846-5 and N-757-5 (or a certificate split from any of these certificates) shall be used to supply the required SOx offsets, unless a revised offsetting proposal is received and approved by the District. Following the revisions, this Authority to Construct permit shall be re-issued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to re-issuance of this Authority to Construct permit. [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-88 Prior to operating under ATCs N-2697-5-0, N-2697-6-0 and N-2697-7-0, the permittee shall mitigate the following quantities of PM10: 1st quarter: 19,112 lb, 2nd quarter: 19,112 lb, 3rd quarter: 19,112 lb, and 4th quarter: 19,112 lb. Offsets shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/06). [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-89 PM10 ERCs S-2844-4, C-911-4, N-756-4, C-913-4, C-912-4, and SOx ERCs S-2843-5, S-2845-5, S-2858-5, N-759-5, N-758-5, S-2846-5 and N-757-5 (or a certificate split from any of these certificates) shall be used to supply the required PM10 offsets, unless a revised offsetting proposal is received and approved by the District. Following the revisions, this Authority to Construct permit shall be re-issued, administratively specifying the new offsetting

proposal. Original public noticing requirements, if any, shall be duplicated prior to re-issuance of this Authority to Construct permit. [District Rule 2201]

Verification: The project owner shall submit to both the District and CPM records showing that the project's offset requirements have been met prior to initiating operation.

AQ-90 The District has authorized to use SOx reductions to overcome shortfall in the amount of PM10 offsets at SOx/PM10 interpollutant offset ratio of 1.00. [District Rule 2201]

Verification: No verification necessary.

EQUIPMENT DESCRIPTION, UNIT N-2697-6-0

69,000 GALLON/MIN COOLING TOWER WITH SEVEN CELLS SERVED BY HIGH EFFICIENCY DRIFT ELIMINATORS

AQ-91 The permittee shall not begin actual onsite construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-92 This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District NSR Rule]

Verification: No verification necessary.

AQ-93 Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

Verification: The project owner shall submit to both the District and CPM the Title V Operating Permit application prior to operation.

AQ-94 No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-95 The owner or operator shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-96 The District shall be notified in writing within ten 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. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-97 No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-98 Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Verification: The results of water recirculation rate and total dissolved solids concentration analysis data shall be included in the quarterly operation report (**AQ-SC8**).

AQ-99 No hexavalent chromium containing compounds shall be added to cooling tower circulating water. [District Rule 7012]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-100 The drift rate shall not exceed 0.0005%. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-101 PM10 emissions shall not exceed 22.4 pounds per day. [District Rule 2201]

Verification: The results of water recirculation rate and total dissolved solids concentration analysis data shall be included in the quarterly operation report (**AQ-SC8**).

AQ-102 Compliance with the PM10 emission limit (lb/day) shall be demonstrated by using the following equation: Water Recirculation Rate (gal/day) x 8.34 lb/gal x Total Dissolved Solids Concentration in the blowdown water (ppm x 10E-06) x Design Drift Rate (%). [District Rule 2201]

Verification: The results of water recirculation rate and total dissolved solids concentration analysis data shall be included in the quarterly operation report (**AQ-SC8**).

AQ-103 Compliance with PM10 emission limit shall be determined by blowdown water sample analysis by independent laboratory within 60 days after the end of commissioning period of the gas turbine system and at least once quarterly thereafter. [District Rules 2201 and 1081]

Verification: The project owner shall use the results of water recirculation rate and total dissolved solids concentration analysis data to determine emissions (lb/day and grains/dscf) and the results shall be included in the quarterly operation report (**AQ-SC8**).

EQUIPMENT DESCRIPTION, UNIT N-2697-7-0

36.5 MMBTU/HR RENTECH BOILER SYSTEMS INC "D" TYPE BOILER (OR EQUIVALENT) EQUIPPED WITH A TODD/COEN RMB ULTRA LOW-NO_X BURNER (PART OF SIEMENS' "FLEX-PLANT 30" SYSTEM)

AQ-104 The permittee shall not begin actual onsite construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-105 This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District NSR Rule]

Verification: No verification necessary.

AQ-106 Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

Verification: The project owner shall submit to both the District and CPM the Title V Operating Permit application prior to operation.

AQ-107 All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-108 No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-109 No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-110 Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Verification: The project owner shall submit the results of fuel sulfur content analysis to both the District and CPM in accordance with **AQ-43**.

AQ-111 The unit shall only be fired on PUC-regulated natural gas. [District Rules 2201 and 4320]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-112 A non-resettable, totalizing mass or volumetric fuel flow meter to measure the amount of natural gas combusted in the unit shall be installed, utilized and maintained. [District Rule 2201, 40 CFR60.48(c)(g)]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-113 The total mass emissions of NOx, VOC, CO, PM10 and SOx that are emitted during the commissioning period shall accrue towards the quarterly emission limits. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-114 During commissioning period, the owner or operator shall keep records of the natural gas fuel combusted in the boiler on daily basis. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-115 The owner or operator shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-116 The District shall be notified in writing within ten 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. [District Rule 1100]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-117 NOx (as NO2) emissions shall not exceed 7.0 ppmvd @ 3% O2. [District Rules 2201, 4305, 4306 and 4320]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-118 CO emissions shall not exceed 50 ppmvd @ 3% O2. [District Rules 2201, 4305, 4306 and 4320]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-119 VOC (as CH4) emissions shall not exceed 10.0 ppmvd @ 3% O2. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-120 PM10 emissions shall not exceed 0.0076 lb/MMBtu. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-121 SOx emissions shall not exceed 0.00285 lb/MMBtu. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-122 NOx (as NO2) emissions from this unit shall not exceed any of the following: 1st quarter: 310 lb; 2nd quarter: 310 lb; 3rd quarter: 310 lb; 4th quarter: 310 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-123 CO emissions from this unit shall not exceed any of the following: 1st quarter: 1,348 lb; 2nd quarter: 1,348 lb; 3rd quarter: 1,348 lb; 4th quarter: 1,348 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-124 VOC emissions from this unit shall not exceed any of the following: 1st quarter: 154 lb; 2nd quarter: 154 lb; 3rd quarter: 154 lb; 4th quarter: 154 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-125 PM10 emissions from this unit shall not exceed any of the following: 1st quarter: 277 lb; 2nd quarter: 277 lb; 3rd quarter: 277 lb; 4th quarter: 277 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-126 SOx (as SO2) emissions from this unit shall not exceed any of the following: 1st quarter: 104 lb; 2nd quarter: 104 lb; 3rd quarter: 104 lb; 4th quarter: 104 lb. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-127 The total CO emissions from the gas turbine system (N-2697-5) and the auxiliary boiler (N-2697-7) shall not exceed 198,000 pounds in any 12-consecutive month rolling period. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-128 All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 4305 and 4306]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-129 Source testing to measure NOx and CO emissions from this unit while fired on natural gas shall be conducted within 60 days of the end of commissioning period of the gas turbine system. [District Rules 2201, 4305 and 4306]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-130 Source testing to measure NOx and CO emissions from this unit while fired on natural gas shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the

result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**. Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months or every 36 months as specified by this condition.

AQ-131 The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 4305 and 4306]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-132 Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-133 NOx emissions for source test purposes shall be determined using EPA Method 7E or CARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-134 CO emissions for source test purposes shall be determined using EPA Method 10 or CARB Method 100. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-135 Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or CARB Method 100. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-136 For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-137 The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

Verification: The project owner shall submit the proposed protocol for the source tests to both the District and CPM for approval in accordance with condition **AQ-38**.

AQ-138 The owner or operator shall submit an analysis showing the fuel's sulfur content at least once every year. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement, provided they establish the fuel's sulfur content. [District Rule 4320]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-139 Fuel sulfur content shall be determined using EPA Method 11 or EPA Method 15 or District, CARB and EPA approved alternative methods. [District Rule 4320]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-140 The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications given in District Policy SSP-1105. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within five days of restarting the unit unless monitoring has been performed within the last month. [District Rules 4305, 4306 and 4320]

Verification: The results of the boiler stack emission monitoring data shall be summarized and submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-141 If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than one hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after one hour of operation after detection, the permittee shall notify the District within the following one hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 4305, 4306 and 4320]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**). The results of the boiler stack emission monitoring data shall be summarized and submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-142 All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 4305, 4306 and 4320]

Verification: The project owner shall provide a protocol for any alternate monitoring parameters at least 60 days prior to implementing alternate monitoring procedures. The results of the boiler stack emission monitoring data shall be summarized and submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-143 The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 4305, 4306 and 4320]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-144 The permittee shall maintain daily records of the type and quantity of fuel combusted by the boiler. [District Rule 2201, 40 CFR 60.48(c)(g)]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-145 The permittee shall maintain records of: (1) the date, (2) heat input rate, MMBtu/day, (3) daily emissions (lb/day) for each pollutant listed in this permit, and (4) quarterly emissions (lb) for each pollutant listed in this permit. [District Rule 2201]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-146 All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 4305, 4306 and 4320]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

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AIR QUALITY APPENDIX AIR-1

Greenhouse Gas Emissions

Brewster Birdsall, P.E., QEP and Matthew Layton, P.E.

SUMMARY OF CONCLUSIONS

The Lodi Energy Center (LEC) project is a proposed addition to the state's electricity system. It would be an efficient, new, dispatchable natural gas-fired combined cycle power plant that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. Its addition to the system would displace other less efficient plants and facilitate the integration of renewable resources. Because the project's emissions per megawatt-hour (MWh) would be lower than those of other power plants that the project would displace, the addition of Lodi Energy Center would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG[1] emissions and GHG emission rate average.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.). The project may be subject to additional reporting requirements and GHG reductions or trading requirements as these regulations are more fully developed and implemented.

On October 8, 2008, the Energy Commission adopted an order initiating an informational (OII) proceeding (08-GHG OII-1) to solicit comments on how to assess the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA). This analysis provides the staff's conclusions regarding greenhouse gas emissions for this siting case. Future power plant siting cases are likely to be reviewed with the benefit of new information and policy direction from the Energy Commission in response to the OII. This analysis recognizes that "prudent use" of natural gas for electricity generation will serve to optimize the system (for integrating intermittent renewable generation and providing reliability), but, without further analysis and policy direction by the Commission to refine this general understanding, this analysis leaves the implications for optimizing the system to future cases (CEC 2009a).

The operation of LEC would affect the overall electricity system operation and GHG emissions in several ways:

- Lodi Energy Center would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.

[1] Fuel-use closely correlates to carbon dioxide (CO_2) emissions from natural gas-fired power plants. And since CO_2 emissions from the fuel combustion dominate greenhouse gas (GHG) emissions from power plants, CO_2 and GHG are used interchangeably in this section.

- Lodi Energy Center would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the Stockton area.
- Lodi Energy Center would facilitate to some degree the replacement of out-of-state high-GHG emitting (e.g., coal-fired) electricity generation that must be phased out in conformance with the State's new Emissions Performance Standard.
- Lodi Energy Center could facilitate to some extent the replacement of generation provided by aging power plants that use once-through cooling.

The ability and magnitude to which Lodi Energy Center would fulfill these roles is uncertain. The proposed LEC would be designed to provide flexible, dispatchable power because it would include rapid startup features, but the applicant has not been able to commit to providing fast-starting capabilities under all conditions until possibly after one full year of operating experience (Response to Workshop Queries 25 and 26, CH2MHILL2009b and CH2M2009c, p. 5.1-26). While the energy displaced by the Lodi Energy Center project would result in a reduction in GHG emissions from the electricity system, the project's role in optimizing the system and its potential GHG benefits are less than ideal for two reasons: 1) the applicant is not able to commit to the proposed technology providing fast-starting capabilities under all conditions, and 2) its proposed location would not be physically within a major local reliability area like the Greater Bay Area. Still, the project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a net reduction in GHG emissions from power plants, would not worsen, but would improve, current conditions, and would, thus, not result in impacts that are cumulatively significant.

Staff concludes that the short-term emission of greenhouse gases during construction would be sufficiently reduced by "best practices" and would not be significant.

The project would comply with the limits of the Greenhouse Gas Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants.

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. The state has demonstrated its intent to address global climate change though research, adaptation,[2] and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

[2] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state's climate (for example, changing rainfall patterns).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	California Global Warming Solutions Act of 2006. This act requires the California Air Resources Board (ARB) to enact standards that will reduce GHG emissions to 1990 levels. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	ARB regulations implementing mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 MTCO2/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lb CO_2/MWh)

GLOBAL CLIMATE CHANGE AND CALIFORNIA

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Health & Safety Code, sec. 38500).

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 require reporting of greenhouse gases or global climate change[3] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). Three years later,

[3] Global climate change is the result of greenhouse gases, or emissions with global warming potentials, affecting the energy balance and, thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[4] To achieve this, ARB has a mandate to define the 1990 emissions levels and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011, and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities over 1 megawatt (MW) capacity, and the due date for initial reports by existing facilities this first year was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by the ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a 33% Renewables Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008c).

It is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though the sector currently only produces about 25% of the state's GHG emissions. In response, in September 2008 the Energy Commission and the California Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified points of regulation within the sector should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC

[4] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

2007a). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% Renewables Portfolio Standard.

SB 1368,[5] enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit California utilities from entering into long-term commitments with any base load facilities that exceed the Greenhouse Gas Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[6] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[7] If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60%. As a project applying for the flexibility to operate in base load scenarios, Lodi Energy Center would have to meet the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. As with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver the adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation unavoidably curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[8] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

[5] Public Utilities Code § 8340 et seq.

[6] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

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

[8] See CEC 2009b, p. 95.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. In this context, and because fossil-fueled resources produce GHG emissions, it is important to consider the role and necessity of also adding fossil-fuel resources. A report prepared as a response to the GHG OII (CEC 2009a) defines five roles that gas-fired power plants are likely to fulfill in a high-renewables, low-GHG system (CEC 2009b, pp 93 and 94):

1. Intermittent generation support
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

The Energy Commission staff-sponsored report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-fueled. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable. Solid fueled projects are also generally base load, not dispatchable and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

Generation of electricity using any fossil fuel, including natural gas, can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of a variety of equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of Lodi Energy Center would involve 24 months of activity, and building the linear facilities would require two months. The applicant provided a GHG emission estimate for the entirety of the construction phase (CH2M2009g) and it appears to rely on fuel use estimates that exceed those in AFC Appendix 5.1-E. This preliminary construction estimate, presented below in

Greenhouse Gas Table 2, includes the total emissions for the 24 months of construction activity in terms of CO_2-equivalent.

Greenhouse Gas Table 2
Lodi Energy Center, Estimated Potential
Construction Greenhouse Gas Emissions

Construction Source	Construction-Phase GHG Emissions (MTCO2E) [a]
Onsite construction	36,383
Deliveries to construction site	1,930
Worker travel to/from construction site	1,888
Construction of linear facilities	284
Deliveries to linear facilities construction areas	155
Worker travel to/from linear facilities construction areas	14
Construction Total	40,654

Source: Response to Data Request 56B, Table DR56B-1 (CH2MHILL2009g).
Notes: a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

PROJECT OPERATIONS

The proposed Lodi Energy Center would expand the existing 49 MW Northern California Power Agency (NCPA) Combustion Turbine Project #2 (NCPA STIG plant) by adding a new 296 MW combined cycle power plant. The proposed LEC project would include a new natural gas-fired combustion turbine generator (CTG) and a new steam turbine generator (STG) operating on heat recovered from the CTG exhaust in an un-fired heat recovery steam generator (HRSG). This system would be equipped with rapid startup features designed by Siemens (CH2M2009c), and the proposed CTG and STG would be capable of operating in a highly-efficient base load mode. The project would be equipped with an auxiliary boiler to maintain the temperature of the HRSG and STG, to limit the duration of startups. However, without having operating experience with this type of plant, the applicant has not been able to commit to less than three hours for a cold startup (NCPA2009b). Lodi Energy Center would have the capability to complete hot startups[9] in less than two hours (CH2M2009c).

The proposed Lodi Energy Center project would be permitted to operate as a base load power plant. The primary sources of GHG would be the natural gas fired combustion turbine, the auxiliary boiler, and sulfur hexafluoride emissions from new electrical component equipment. The employee and delivery traffic GHG emissions from off-site activities are negligible in comparison with the gas turbine and boiler GHG emissions.

[9] A *cold startup* for the LEC STG/HRSG system is defined as startup of the combined cycle system following a CTG shutdown lasting at least 12 hours. During a cold startup of the steam turbine system, the CTG system is initially brought on line at low load to gradually increase the temperature of the STG and prevent thermal metal fatigue. A *hot startup* is defined as a startup of the combined cycle system following a shutdown of less than 12 hours (NCPA2008a).

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. A small amount of additional SF_6 containing equipment will be required for this project, and the leakage of SF_6 and its CO_2 equivalent emissions have been estimated.

Greenhouse Gas Table 3
Lodi Energy Center, Estimated Potential Greenhouse Gas (GHG) Emissions

Emissions Source	**Operational GHG Emissions (MTCO2E/yr)** [a]
Combustion Turbine Generator with Auxiliary Boiler and STG	936,614
Circuit Breakers (SF_6)	23
Worker Commutes – Off-Site	51
Material Deliveries – Off-Site	59
Total Project GHG Emissions, excluding Off-Site Emissions (MTCO2E/yr)	**936,637**
Estimated Annual Energy Output (MWh/yr) [b]	2,592,960
Estimated Annualized GHG Performance (MTCO2/MWh)	**0.361**
Estimated Annualized GHG Performance (MTCO2E/MWh)	**0.361**

Sources: AFC Appendix Table 5.1A-7R (CH2M2009c) and Tables DR57-1 and DR57-3 (CH2MHILL2009g) including methane (CH_4) and nitrous oxide (N_2O).
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. Annualized basis of operation is estimated to be 8,760 hours at 296 MW with 4,000 hours of auxiliary boiler operation (CH2M2009c, Tables 5.1-22R and 5.1A-7R).

The proposed project would be permitted, on an annual basis, to emit over 936,000 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. The proposed LEC combined cycle plant, at 0.36 MTCO2/MWh, would easily meet the limits of SB 1368 and the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

The proposed project would increase the available energy and capacity to the electricity system, and the Stockton Local Capacity Area in San Joaquin County and Stanislaus County would likely benefit from the incremental increase in energy and capacity. However, the project would not be physically located in a major local reliability area that has, or is projected to have, capacity shortfalls. A project located in a major load pocket, for example, the Greater Bay Area Local Capacity Area, would be more likely to provide local reliability support and facilitate the retirement of other less-efficient power plants to a degree that the Lodi Energy Center project could not.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation. Staff is continuing to monitor development of AB 32 Scoping Plan implementation efforts and general trends and developments affecting GHG regulation in the electricity sector.

The impact of GHG emissions caused by this natural gas-fired facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on generation resources to provide energy and satisfy local capacity needs. As directed by the OII (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes the long-term role of fossil-fueled power plants in California's electricity system. The five separate roles that gas-fired power plants are most likely to fulfill in the future of a high-renewables, low-GHG system include: 1) Intermittent generation support; 2) Local capacity requirements; 3) Grid operations support; 4) Extreme load and system emergencies support; and 5) General energy support (CEC 2009b, p. 93). Lodi Energy Center is analyzed here for its role in providing local capacity and generation and general energy support for expected generation retirements or replacements.

CONSTRUCTION IMPACTS

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emissions, such as limiting idling times and requiring, as appropriate, using equipment that meets the latest criteria pollutant emissions standards would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will increase fuel efficiency and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment.

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

New, efficient, natural gas-fired generation promotes the state's efforts to improve overall system efficiencies and, therefore, reduce the amount of natural gas used by electricity generation and greenhouse gas emissions. As the *2007 Integrated Energy Policy Report* (CEC 2007a, p. 184) noted:

> New natural gas-fueled electricity generation technologies offer efficiency, environmental, and other benefits to California, specifically by reducing the amount of natural gas used—and with less natural gas burned, fewer greenhouse gas emissions. Older combustion and steam turbines use outdated technology that makes them less fuel- and cost-efficient than newer, cleaner plants.…The 2003 and 2005 IEPRs noted that the state could help reduce natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants.

Thus, in the context of the Energy Commission's *Integrated Energy Policy Report*, the Lodi Energy Center project furthers the state's strategy to promote generation system efficiency and reduce fossil fuel use and GHG emissions. As stated in the 2009 *Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California* (CEC 2009b, p.20):

> When one resource is added to the system, all else being held equal, another resource will generate less power. If the new resource has a lower cost or fewer emissions than the existing resource mix, the aggregate system characteristics will change to reflect the cheaper power and lower GHG emissions rate.

Net GHG emissions for the integrated electric system will decline when new gas-fired power plants are added to: 1) permit the penetration of renewable generation to the 33% target; 2) improve the overall efficiency of the electric system; or 3) serve load growth or capacity needs more efficiently than the existing fleet (CEC 2009b, p. 98). Lodi Energy Center, with its lower heat rate than most other dispatchable gas-fired generation in the state, would be more efficient and lower GHG-emitting than the existing fleet.

The Role of Lodi Energy Center in Local Generation Displacement

The proposed Lodi Energy Center project would have a net heat rate of approximately 6,824 Btu/kWh[10] (CH2M2009c, p. 5.1-21), which leads to an estimated base load annual GHG performance factor of approximately 0.36 MTCO2/MWh. The heat rate, energy output and GHG emissions of other local generation resources are listed in **Greenhouse Gas Table 4**. Compared to most other new and existing units in San Joaquin County and Stanislaus County, the proposed LEC would be more efficient, and emit fewer GHG emissions during any hour of operation. Local generating units with the best (lowest) heat rate or lowest GHG performance factor generally operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2008 from the local units. However, dispatch order can change, or deviate from economic or efficiency dispatch, in any one year or due to other concerns such as permit limits, contractual obligations, droughts, heat waves, local reliability needs or emergencies. These deviations, however, are likely to occur infrequently.

[10] Based on the High Heating Value (HHV) of the fuel(s) used. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

Greenhouse Gas Table 4
San Joaquin and Stanislaus Counties, Local Generation
Heat Rates and 2008 Energy Outputs

Plant Name	Heat Rate (Btu/kWh) [a]	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Walnut Energy Center	7,822	1,578	0.415
Woodland 1	8,761	416	0.465
Lodi CC (NCPA STIG)	9,000	72	0.477
Almond Power Plant	11,074	62	0.587
MID Ripon	11,908	33	0.631
McClure 1, 2	15,222	18	0.807
Tracy Peaker Plant	12,310	11	0.652
Walnut (Peaker)	19,098	1	1.013
Proposed Lodi Energy Center (at permitted limit)	6,824	2,593 (max est.)	0.361

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); with Lodi Energy Center estimated to operate on annualized basis of 8,760 hours at 296 MW (CH2M2009c, Table 5.1A-7R).
Notes: a. Based on the Higher Heating Value or HHV of the fuel.

While Lodi Energy Center is located inside the Stockton Local Capacity Area, it would not be physically within a major local reliability area like the Greater Bay Area, where it would be more likely to provide local reliability and displace other power plants.

The Role of Lodi Energy Center in the Integration of Renewable Energy

As California moves towards an increased reliance on renewable energy, the bulk of renewable generation available to, and used in California, will be intermittent wind generation with some intermittent solar (CEC 2009b, p.3). To accommodate the increased variability in generation due to increasing renewable penetration, compounded by increasing load variability, control authorities such as the California Independent System Operator (CAISO) need increased flexibility from other generation resources such as hydro generation, dispatchable pump loads, energy storage systems, and fast ramping and fast starting fossil fuel generation resources (CAISO 2007, p. 14).

Lodi Energy Center would provide flexible, dispatchable and fast ramping[11] power that would not obstruct penetration of renewable energy. In general, combined cycle combustion turbines can ramp up quickly, but the combined cycle facility overall output is limited to about 15 MW per minute[12] by the steam turbine and HRSG.

[11] The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

[12] Of the 2,821 MW of thermal resources providing Ancillary Services to the CAISO, most (2,441 MW) have ramp rates between 10 and 31 MW/min. The bulk of the resources providing Ancillary Services with ramp rates greater than 10 MW/min (7,141 MW) are hydroelectric facilities (ISO 2007).

Lodi Energy Center would not, however, provide fast starting[13] capabilities when the HRSG and steam turbine are cold. Although the proposed LEC project would include rapid startup design features, the applicant does not have operating experience for this plant and has not been able to commit to providing fast starting capabilities under all conditions (CH2MHILL2009b and 2009c). Intermittent renewable sources of energy would be accommodated by Lodi Energy Center varying its energy output as needed to integrate the renewable sources, but the inability to commit to fast-start capabilities under all conditions makes it likely that Lodi Energy Center may not be able to play a role in some system operating scenarios.

The amount of dispatchable fossil fuel generation will have to be significantly increased to meet the 20% RPS (CAISO 2007, p.113); the 33% RPS will require even more dispatchable resources to integrate the renewables. However, this does not suggest the existing and new fossil fuel capacity will operate more. **Greenhouse Gas Table 5** shows how the build-out of either the 20% or the 33% RPS will affect generation from new and existing non-renewable resources. Should California reach its goal of meeting 33% of its retail demand in 2020 with renewable energy, non-renewable, most likely fossil-fueled, energy needs will fall by over 36,000 GWh/year. In other words, all growth will need to come from renewable resources to achieve the 33% RPS. And some existing and new fossil units will generate less energy than they currently do, given the expected growth in retail sales.

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast.[14] If, for example, forecasted retail sales in 2020 were lowered by 10,000 GWh due to the success of increased energy efficiency expenditures, non-renewable energy needs fall by an additional 8,000 to 6,700 GWh/year, depending on whether 33% or 20% RPS is assumed.

The Role of Lodi Energy Center in Retirements/Replacements

Lodi Energy Center would provide up to 2,593 GWh of natural gas-fired generation to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting resources such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007a). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

[13] In general, fast starts are defined as being less than two hours.

[14] The extent to which uncommitted energy efficiency savings are already represented in the current Energy Commission demand forecast is a subject of study for the 2009 IEPR.

Greenhouse Gas Table 5
Estimated Changes in Non-Renewable Energy
Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, estimated [a]	265,185	
Statewide Retail Sales, 2020, forecast [a]	308,070	
Growth in Retail Sales, 2008-20	42,885	
Growth in Net Energy for Load [b]	46,316	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	61,614	101,663
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020 [c]	32,440	72,489
Resulting Change in Non-Renewable Energy [d]	13,876	(-36,173)

Source: Energy Commission staff 2009.
Notes: a. Not including 8% transmission and distribution losses.
b. Based on 8% transmission and distribution losses, or 42,885 GWh x 0.08 = 46,316 GWh.
c. Renewable standards are calculated on retail sales and not on total generation, which accounts for 8% transmission and distribution losses.
d. Based on net energy (including 8% transmission and distribution losses), not based on retail sales.

Replacement of High GHG-Emitting Generation

High GHG-emitting, such as coal-fired, resources are effectively prohibited from entering into new contracts for California deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under existing contracts will have to be replaced; these contracts are listed in **Greenhouse Gas Table 6**.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[15], all the coal contracts (including those in **Greenhouse Gas Table 6**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may not be able to contract with California utilities due to the SB 1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. New generation resources generally will emit significantly less GHG than the coal and petroleum coke-fired generation, which average about 1.0 MTCO2/MWh, or almost three times more than new natural gas-fired combined-cycle projects like the LEC, resulting in a significant net reduction in GHG emissions from the California electricity sector.

[15] A carbon adder or carbon tax is a specific value added to the cost of a project per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

Greenhouse Gas Table 6
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities[a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emissions Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

Retirement of Generation Using Once-Through Cooling

New, dispatchable resources like Lodi Energy Center would also be required to provide generation capacity (that is, the ability to meet fluctuating, intermittent electricity loads) in the likely event that facilities utilizing once-through cooling (OTC) are retired. The State Water Resource Control Board (SWRCB) has proposed significant changes to OTC units, which would likely require retrofit, retirement, or significant curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While those OTC facilities owned and operated by utilities and recently-built combined-cycle plants may well install dry or wet cooling towers, it is unlikely that the aging, merchant plants will do so. Most of these units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would likely displace the energy provided by OTC facilities and accelerate the retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 7** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

Greenhouse Gas Table 7
Aging Units and Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC [c]	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1 - 6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay Area	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay Area	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay Area	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source; Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings

Notes:
a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.
b. Units are aging but are not OTC.

The Los Angeles Department of Water and Power (LADWP) reported a 2007 aggregate energy number of 4,003 GWh for all the Haynes units. Staff allocated the energy between the units based on Haynes' current and historical output allocations in the LADWP fillings for 2009 IEPR.

New generation resources that can either provide local support or energy will emit significantly less GHGs than aging and/or OTC plants whose generation they could partially displace. Existing aging and OTC natural gas generation averages 0.6 to 0.7 MTCO2/MWh, or less than two times more than new natural gas-fired combined-cycle projects like the LEC. When a new project can provide energy and capacity to displace this existing generation, it can provide a significant net reduction in GHG emissions from the electricity sector. A project located in a load pocket, for example, the Greater Bay Area Local Capacity Area, would more likely provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants to a degree that the Lodi Energy Center project could not.

CUMULATIVE IMPACTS

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts" (CEQA Guidelines § 15355). "A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts" (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This entire assessment is a cumulative impact assessment. The project would emit greenhouse gases and, therefore, has been analyzed as a potential cumulative impact in the context of its effect on the electricity system, resulting GHG emissions from the system, and existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LORS

Ultimately, ARB's AB 32 regulations are likely to address both the degree of electricity generation sector emissions reductions (through cap-and-trade), and the method by which those reductions will be achieved (e.g., through command-and-control). However, the exact approach to be taken is currently under development. That regulatory approach may address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Energy Commission, but also from the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could presently impose. This programmatic approach is likely to be more effective in reducing GHG emissions overall from the electricity sector than one that merely relies on displacing out-of-state coal plants ("leakage") or older "dirtier" facilities.

The Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified the regulation points should ARB decide that a multi-sector cap-and-trade system is warranted. As ARB codifies accurate GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness.

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The ARB's mandatory GHG emissions reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. The Lodi Energy Center project would meet the current Emission Performance Standard in SB 1368.

NOTEWORTHY PUBLIC BENEFITS

Electricity is produced by operation of inter-connected generation resources and, by knowing the fuel used by the generation sector, the resulting GHG emissions can be known. The operation of LEC would affect the overall electricity system operation and GHG emissions in several ways:

- Lodi Energy Center would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- Lodi Energy Center would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the Stockton area.
- Lodi Energy Center would facilitate to some degree the replacement of out-of-state high-GHG emitting (e.g., coal-fired) electricity generation that must be phased out in conformance with the State's new Emissions Performance Standard.
- Lodi Energy Center could facilitate to some extent the replacement of generation provided by aging power plants that use once-through cooling.

The project would likely lead to a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The energy displaced by the proposed LEC project would result in a reduction in GHG emissions from the electricity system. In other system roles, as described in **Greenhouse Gas Table 8**, the ability to minimize its GHG impacts by filling the expected future roles for gas-fired generation, in a high-renewables, low-GHG system, is not well defined for the Lodi Energy Center project due to its location and due to the applicant not being able to commit to providing fast starting capabilities under all conditions.

Greenhouse Gas Table 8
LEC, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, Lodi Energy Center
Integration of Renewable Energy	• *Would not* provide fast startup capability (within two hours), except during hot start conditions. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable.
Local Generation Displacement	• *Would not* be able to satisfy/partially satisfy local capacity area (LCA) resource requirements. • Would provide voltage support. • *Would not* provide black start capability.
Ancillary Services, Grid System, and Emergency Support	• *Would not* provide fast start-up capability (within two hours), except during hot start conditions. • *Would not* have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • *Would not* provide black start capability.
General Energy Support	• Would provide general energy support. • Could facilitate some retirements and replacements • Would provide cost-competitive energy. • Would be able to help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

Source: Energy Commission staff; based on: Expected Roles for Gas-Fired Generation (CEC2009b, p. 7).

CONCLUSIONS

Lodi Energy Center would be an efficient, new, dispatchable natural gas-fired combined cycle power plant that would cause GHG emissions while generating electricity for California consumers. AB 32 emphasizes that GHG emission reductions must be “big picture” reductions that do not lead to “leakage” of such reductions to other states or countries. The project’s GHG emissions per MWh would be lower than those of other power plants and peaking projects that the project would displace and, thus, would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system’s GHG emissions and GHG emission rate average.

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state’s power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. Other potential GHG benefits gained by the project’s

ole in optimizing the system are less defined for Lodi Energy Center with its location outside of a major local reliability area and the applicant not being able to commit to providing fast starting capabilities under all conditions.

Staff notes that mandatory reporting of GHG emissions per Air Resources Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate the LEC in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations are more fully developed and implemented.

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures, or best practices, that staff recommends for minimizing criteria pollutants, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since staff believes that the use of newer equipment would increase fuel efficiency and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the short-term emission of greenhouse gases during construction would be substantially reduced and would, therefore, not be significant.

The Lodi Energy Center project would meet the Emission Performance Standard of SB 1368.

PROPOSED CONDITIONS OF CERTIFICATION

None proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, section 95100 et. seq.) and/or future GHG regulations formulated by the ARB, such as limits set by GHG emissions cap and trade markets.

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BIOLOGICAL RESOURCES

Testimony of Joy Nishida

SUMMARY OF CONCLUSIONS

The proposed Northern California Power Agency (NCPA) Lodi Energy Center (LEC) is located in northern San Joaquin Valley in the Sacramento-San Joaquin Delta within San Joaquin County. San Joaquin County has a Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) which covers the proposed LEC project. The proposed project consists of the LEC power plant site, a 2.7-mile gas pipeline, and laydown areas.

An adjacent irrigation canal to the south of the LEC project site has been identified as potential habitat for giant garter snake (GGS), a state and federal protected species. The SJMSCP requires a 200-foot buffer from GGS habitat, which the applicant will not be able to maintain during construction activities. In addition, one laydown area and the southern end of two other laydown areas and the LEC project site are located within the 200-foot GGS habitat buffer. The proposed natural gas pipeline will also be located within the 200-foot buffer. The applicant applied for a variance with the administrators of the SJMSCP, SJCOG, Inc., (SJCOG) to reduce the buffer zone to 30 feet and propose mitigation for the variance. Due to the 170-foot encroachment of the required 200-foot buffer, 5.9 acres of upland GGS habitat will be impacted by the proposed project. The project proponent has proposed via an in-lieu land swap, 17.7 acres immediately east of the White Slough Wildlife Preserve at a 3:1 mitigation ratio. The proposed natural gas pipeline would also impact 3.55 acres of Swainson's hawk habitat in agricultural lands. The project proponent has proposed at a 1:1 mitigation ratio, 3.55 acres added to the same in-lieu land swap proposed for the GGS variance, totaling 21.25 acres (17.7 acres + 3.55 acres). In addition to the in-lieu land swap, a one-time endowment fee of $43,503.74 is expected as a requirement for the SJMSCP. Approval of the variance by the SJCOG Habitat Technical Advisory Committee (HTAC) consisting partly of SJCOG's Habitat Planners and representatives from the U. S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) with concurrence from SJCOG Joint Powers Authority (JPA) has been granted. Impact avoidance and minimization measures described in staff's analysis and included in the proposed Conditions of Certification would help reduce impacts to sensitive biological resources. These measures along with the mitigation provided in the variance would offset project-related losses to biological resources to less-than-significant levels.

INTRODUCTION

This section provides the California Energy Commission staff's preliminary analysis of potential impacts to biological resources from the construction and operation of the LEC as proposed by NCPA. This analysis addresses potential impacts to state and federally listed species, species of special concern, and other areas of critical biological concern. Information contained in this document includes a detailed description of the existing biotic environment, an analysis of potential impacts to biological resources and, where necessary, specifies mitigation planning and compensation measures to reduce

potential impacts to less than significant levels. Additionally, this analysis determines compliance with applicable laws, ordinances, regulations, and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, on information provided in the Application for Certification for the LEC, ongoing contact with the applicant, responses to staff data requests, a staff site visit conducted on September 12, 2008, and discussions with SJCOG, USFWS, CDFG, and U.S. Army Corps of Engineers (USACE).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant shall abide by the following Laws, Ordinances, Regulations, and Standards (LORS) listed in **Biological Resources Table 1,** during project construction and operation.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Endangered Species Act (Title 16, United States Code, section 1531 *et seq*.; Title 50, Code of Federal Regulations, part 17.1 *et seq*.)	Designates and provides for the protection of federally listed threatened and endangered plant and animal species, and their designated critical habitat. The administering agency is USFWS.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703-711)	Prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. The administering agency is USFWS.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26)))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the USACE for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a Regional Water Quality Control Board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals that are classified as rare, threatened, or endangered in California.

Applicable Law	Description
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits take of such species or their habitat. The administering agency is CDFG.
California Native Plant Protection Act of 1977 (Fish and Game Code, section 1900 *et seq*.)	Designates rare, threatened, and endangered plants in California, prohibits the taking of listed plants. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFG.
Significant Natural Areas (Fish and Game Code, section 1930 *et seq*.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Local	
San Joaquin County Multi-Species Habitat Conservation and Open Space Plan	Outlines conservation measures for both federally listed and state listed special-status species and significant natural community types in San Joaquin County. SJCOG, Inc. administers the plan.
San Joaquin County General Plan	Protects significant oak groves, heritage trees, native oak trees, and riparian habitats in San Joaquin County.
Protection of City Trees, Shrubs, and Plants (City of Lodi Ordinance 1652)	Prohibits the removal or damage to any trees, shrubs, and plants which are located on City property or within the public right of way without prior authorization.

SETTING

REGIONAL SETTING

The proposed LEC site would be located in northern San Joaquin Valley on property owned and incorporated by the city of Lodi in San Joaquin County, approximately six miles west of the Lodi city center and approximately two miles north of Stockton. Major roadways include Interstate 5 immediately to east and State Highway 12 approximately two miles to the north of the proposed site. This proposed site is in the Sacramento-San Joaquin Delta which historically consisted of large tidally influenced marshes with riparian habitats along natural levees. However, these natural environments have been largely converted to agricultural land uses. White Slough Wildlife Area is a nearby natural area where special-status species have been recorded. California Department of Water Resources owns White Slough Wildlife Area and is managed by CDFG. White Slough Wildlife Area is located approximately 0.5 mile west of the proposed project site.

PROJECT SITE AND VICINITY DESCRIPTION

The proposed project consists of the 4.4-acre LEC site, four laydown and parking (laydown) areas A through D, totaling 9.8 acres, and a 2.7-mile natural gas pipeline with a 1.1-acre laydown area. Near the proposed project, agricultural production is the predominant land use, with industrial facilities. The proposed LEC site is located along the east and south sides of the existing NCPA Combustion Turbine Project #2 (STIG) power plant. East and north of the proposed LEC site is the city of Lodi White Slough Water Pollution Control Facility (WPCF) treatment and holding ponds. The San Joaquin County Mosquito and Vector Control facility is located to the south. The proposed LEC site and four laydown areas are located on city of Lodi property within an already disturbed and developed area. The proposed 2.7-mile natural gas pipeline would extend to the east of the LEC site and connect to PG&E's high-pressure natural gas pipeline #108. The proposed natural gas pipeline would cross agricultural areas, follow a drainage ditch, and go along the easement of paved roads near some rural residential areas.

Existing Vegetation and Wildlife

The applicant conducted field surveys of biological resources within the proposed LEC project site and laydown areas on April 30, 2008, and the proposed natural gas pipeline corridor on May 14, 2008, and February 11, 2009. The surveys included an inventory of common and special-status plant and wildlife species and an assessment of the study area's potential to support special-status species based on habitat suitability comparisons and similarities to known occupied habitats. Additional wildlife and Swainson's hawk nesting surveys were conducted in 2009 (CH2MHILL 2009e). A more general analysis was conducted for the areas within a 1-mile radius of the proposed site.

The proposed LEC site and four laydown areas are highly disturbed due to grading and landscaping done previously for the development of the STIG power plant and WPCF sites. As a result, native plant communities are not present on the project site. Approximately 3.4 acres of the proposed 4.4-acre LEC site has been previously graded. Though largely devoid of herbaceous cover, when present, is limited to scattered weedy annuals including perennial pepperweed (*Lepidium latifolium*), Russian thistle (*Salsola tragus*), and yellow starthistle (*Centaurea solstitialis*). A paved access road for the current STIG power plant cuts across the south end of the site. The area north of the paved access road is used as a laydown and storage area for ongoing construction at the WPCF. The area south of the paved access road consists of non-native annual grassland/ruderal habitat and includes a low swale area at the southwest corner of the proposed project site. The swale contains perennial pepperweed and heliotrope (*Heliotropium curassavicum*). Also associated with the swale are Fremont cottonwood trees (*Populus fremontii*) and black locust trees (*Robinia pseudoacacia*). The swale grades into disturbed ruderal vegetation to the east consisting of perennial pepperweed, foxtail barley (*Hordeum murinum* ssp. *leporinum*), rip-gut brome (*Bromus diandrus*), soft chess brome (*Bromus hordeaceus*), Italian thistle (*Carduus pycnocephalus*), yellow starthistle, Himalayan blackberry (*Rubus discolor*), and stinging nettle (*Urtica dioica*).

Four laydown areas (labeled A through D) located adjacent to the WPCF totaling 9.8 acres, are proposed for laydown and parking during construction. Laydown Area A is

located on the northeast side of the WPCF between a water treatment pond to the west and North Cord Road to the east. Approximately two-thirds of the northern portion of the 3.1-acre site is non-native annual grassland which is routinely mowed. The grassland consists of primarily of rip-gut brome with foxtail barley, yellow starthistle, wild radish (*Raphanus sativa*), black mustard (*Brassica nigra*), and fiddleneck (*Amsinckia menziesii*). A few small valley oaks (*Quercus lobata*) occur on the north end of Laydown Area A. The southern third of this proposed laydown area consists of a leveled gravel and landscaped area.

The 2.2-acre Laydown Area B is located on the southeast corner of the WPCF between the paved access road to the STIG power plant to the west and Interstate 5 to the east. Large ornamental landscape trees consisting of Scotch pine (*Pinus sylvestris*), Australian pine (*Casuarina equisetifolia*), and bluegum (*Eucalyptus globulus*) and a few small valley oaks are scattered throughout with non-native annual grassland components similar to Laydown Area A in the understory.

The 1.6-acre Laydown Area C is located south of the WPCF between the paved access road to the STIG power plant to the north and an off-site irrigation canal to the south. This site consists of a planted row of small valley oaks and a Fremont cottonwood on the east end of this area. Non-native annual grassland similar in composition to Laydown Area A makes up the understory, though the habitat is more disturbed; some areas appear to have been used as temporary storage and laydown.

The 2.9-acre Laydown Area D is located on the south edge of the WPCF, on the north side of the paved access road to the STIG power plant. The area has been leveled and is currently a gravel parking area on the eastern half and stockpiled with soil and miscellaneous debris on the western half. Along the WPCF fence line in the northwest corner of the proposed laydown area is a patch of weedy vegetation consisting of dense perennial pepperweed, rip-gut brome, wild radish, bur chervil (*Anthriscus caucalis*), and swinecress (*Coronopus didymus*).

The proposed 2.7-mile natural gas pipeline would extend east from the LEC site through the south edge of the WPCF which crosses proposed Laydown Area C, along road easements and a drainage ditch, and crossing agricultural areas to a PG&E high-pressure natural gas pipeline (NCPA 2009a). The proposed pipeline would be located near a few residential areas and farm structures. At the east end of the alignment, a small area of non-native annual grassland associated with an open farm area is also present along the proposed pipeline. Approximately 0.8 miles of the proposed pipeline route is within agricultural lands consisting of fields of irrigated hay and alfalfa. The remaining 1.9 miles of the proposed pipeline route is within existing graveled/paved farm access roads, paved county roads (North Thornton Road and West Armstrong Road), and developed areas within the LEC site (CH2MHILL 2009e). A 1.1-acre laydown area occurs along North Thornton Road and is already graveled (Crowe 2009).

Direct field observations in the project area included various sensitive and non-sensitive wildlife species. Sensitive species observed include five Swainson's hawk (*Buteo swainsoni*) nests within 0.5 mile of the proposed project site and gas pipeline route during 2009 wildlife surveys and a white-tailed kite (*Elanus leucurus*) nest in a tree next to proposed Laydown Area D during the 2008 wildlife surveys only (CH2MHILL 2009e).

Non-sensitive wildlife species include Audubon cottontail (*Sylvilagus audubonii*), California ground squirrels (*Spermophilus beecheyi*), and a variety of bird species typically found in disturbed/developed areas such as house finch (*Carpodacus mexicanus*), rock dove (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), western scrub-jay (*Aphelocoma californica*), American robin (*Turdus migratorius*), northern mocking bird (*Mimus polyglottus*), mourning dove (*Zenaida macroura*), brown-headed cowbird (*Molothrus ater*), killdeer (*Charadrius vociferous*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), American crow (*Corvus branchyrhynchos*), cliff swallow (*Petrochelidon fulva*), and Brewer's blackbird (*Euphagus cyanocephalus*). Additional bird species identified during surveys include red-tailed hawk (*Buteo jamaicensis*), song sparrow (*Melospiza melodia*), barn swallow (*Hirundo rustica*), black phoebe (*Sayornis nigricans*), red-winged blackbird (*Agelaius phoeniceus*), Bullock's oriole (*Icterus bullockii*), bushtit (*Psaltriparus minimus*), killdeer (*Charadrius vociferous*), and Wilson's warbler (*Wilsonia pusilla*). Red-tailed hawks were observed nesting between proposed Laydown Areas A and B and killdeer were nesting on the north edge of the proposed LEC site.

Agricultural land uses have a direct effect upon the type of wildlife species that are likely to use an area. Croplands are generally found on fertile soils on flat or nearly flat topography that historically supported prime habitat for native species. Although agricultural fields can provide a year-round source of food for various wildlife species, agricultural activities including harvest practices, fencing, trapping, and pesticide/herbicide application can reduce the value of these lands to wildlife. However, these areas may still provide foraging habitat for migrating and resident birds, and various mammals including coyotes. Suitable habitat for ground-nesting birds may occur along the weedy edges of fields and irrigation canals that are adjacent to the project site.

Wetlands were not identified within the proposed project area. During an informal visit by staff on September 12, 2008, a swale was observed in the southwest corner of the proposed LEC site containing perennial pepperweed and heliotrope, which are facultative wet (FACW) and obligate (OBL) species, respectively. A FACW plant is one which usually occurs in wetlands (estimated probability 67-99%), whereas an OBL plant occurs almost always under natural conditions in wetlands (estimated probability 99%). It was determined that additional data from this area were necessary to determine whether or not the swale is a wetland. Three sample points were taken by the applicant on December 4, 2008, to ascertain if the wetland indicators from each criterion of vegetation, soil, and hydrology were met. A technical memorandum dated January 12, 2009, titled "Wetland Concerns-Technical Memorandum" (CH2MHILL 2009a) determined that the swale did not meet the criteria of a wetland and therefore, is not considered a waters of the U.S. The USACE issued a finding of no water of the United States on the site based on the technical memorandum and site verification conducted on March 5, 2009 (USACE 2009). An agricultural drainage located offsite immediately south of the proposed LEC is connected to White Slough and is considered jurisdictional waters of the U.S. by the USACE (Hanlon 2009). The drainage does support vegetation and is considered potential habitat for giant garter snake (GGS) (*Thamnophis gigas*) (SJCOG 2000), western pond turtle (*Actinemys marmorata*), northwestern pond turtle (*Actinemys marmorata marmorata*), and California black rail (*Laterallus jamaicensis coturniculus*). The giant garter snake and California black rail

are known to occur in the White Slough Wildlife Area located approximately 0.5 mile west of the proposed LEC site (SJCOG 2000). The nearest reported occurrence for western pond turtle is approximately 0.7 mile northwest of the LEC project site and 1.7 miles to the southwest in Telephone Cut along the north side of Bishop Tract for the northwestern pond turtle.

Special-Status Species

For the purposes of this analysis, “special-status species” include any species that has been afforded special recognition by federal, state, or local resource agencies (e.g., USFWS, CDFG, etc.) and/or resource conservation organizations (e.g., California Native Plant Society (CNPS)). The term “special-status species” excludes those avian species solely identified under section 10 of the Migratory Bird Treaty Act for federal protection. **Biological Resources Table 2** identifies the special-status species that were historically present or have the potential to be present within the vicinity of the proposed project area.

Special-status plant species were not observed in or adjacent to the proposed project area during biological reconnaissance surveys conducted by the applicant on April 30, 2008, May 14, 2008, February 11, 2009, or subsequent staff site visit conducted on September 12, 2008. Special-status plant species are not expected to occur in the proposed project area. The California Natural Diversity Database (CNDDB) (CDFG 2009) and CNPS (CNPS 2009) literature search identified eight plant species that are known to occur within the vicinity of the proposed project area. The only recorded occurrence of special-status plant species within a mile of the proposed LEC site is wooly rose-mallow (*Hibiscus lasiocarpus*) in the White Slough Wildlife Area approximately 0.75 mile to the west. The wooly rose-mallow and other special-status plant species were determined to have little or no potential to occur on site due to the high-level of disturbance from adjacent ongoing agricultural activities and the resulting lack of suitable environmental conditions to support these species.

Special-status wildlife species including Swainson’s hawk and white-tailed kite were observed adjacent to or in the proposed project area during the reconnaissance surveys. Although not observed in the proposed project area, several special-status wildlife species are known to utilize agricultural areas in the region and thus have suitable habitat near the proposed LEC site. These species include but are not limited to GGS, California black rail, western pond turtle, northwestern pond turtle, burrowing owl (*Athene cunicularia*), and tricolored blackbird (*Agelaius tricolor*). These species are indicated with an asterisk in **Biological Resources Table 2**.

Biological Resources Table 2
Special-Status Species Historically or Potentially Occurring in the Vicinity of the Proposed LEC Site

Scientific Name	Common Name	Status	Habitat Type	Potential To Occur
Plants				
Castilleja campestris ssp. *succulenta*	succulent owl's clover	FT/CE/CNPS List 1B	Vernal pools (often acidic); elevation 160—2,460 feet	Low
Hibiscus lasiocarpus	woolly rose-mallow	CNPS List 2	Freshwater marshes and swamps; elevation 0—400 feet	Low
Lathyrus jepsonii var. *jepsonii*	delta tule pea	CNPS List 1B	Freshwater and brackish marshes and swamps; elevation 0—15 feet	Low
Legenere limosa	legenere	CNPS List 1B	Vernal pools; elevation 3—2,900 feet	Low
Lilaeopsis masonii	Mason's lilaeopsis	CNPS List 1B	Freshwater or brackish marshes and swamps, riparian scrub; elevation 0—33 feet	Low
Limosella subulata	delta mudwort	CNPS List 2	Marshes and swamps; elevation 0—10 feet	Low
Scutellaria lateriflora	blue skullcap	CNPS List 2	Marshes and swamps, mesic meadows and seeps; elevation 0—1,650 feet	Low
Symphyotrichum (=Aster) lentum	Suisun Marsh aster	CNPS List 1B	Brackish and freshwater marshes and swamps; elevation 0—10 feet	Low
Insects and Crustaceans				
Branchinecta lynchi	vernal pool fairy shrimp	FT	Vernal pools	Low
Branchinecta mesovallensis	Midvalley fairy shrimp	CSC	Vernal pools	Low
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT	Elderberry shrub stems with diameters of 1 to 8 inches in riparian and oak savannah habitats	Low
Lepidurus packardi	vernal pool tadpole shrimp	FE	Vernal pools and swales	Low

Scientific Name	Common Name	Status	Habitat Type	Potential To Occur
Reptiles and Amphibians				
Ambystoma californiensa	California tiger salamander, central population	FT	Small ponds, lakes or vernal pools	Low
**Actinemys* (*Emys*) *marmorata*	western pond turtle	CSC	Woodlands, grasslands and open forests; occupies aquatic habitats	Moderate – irrigation canal immediately south of site may provide suitable habitat
**Actinemys* (*Emys*) *marmorata marmorata*	northwestern pond turtle	CSC	Woodlands, grasslands and open forests; occupies aquatic habitats	Moderate – irrigation canal immediately south of site may provide suitable habitat
Rana aurora draytonii	California red-legged frog	FT	Permanent and semi-permanent aquatic habitats; may aestivate in rodent burrows or cracks	Low
Rana boylii	foothill yellow-legged frog	CSC	Partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats; need at least cobble-sized substrate for egg-laying	Low
**Thamnophis gigas*	giant garter snake	FT/CT	Sloughs, canals and other small waterways; requires grassy banks and emergent vegetation for basking	Moderate – irrigation canal immediately south of site may provide suitable aquatic habitat with limited upland habitat in the project area; known from nearby White Slough
Fish				
Acipenser medirostris	green sturgeon	FT	Freshwater and saltwater habitats including deep pools in freshwater rivers, oceanic waters, bays, and estuaries	Low
Hypomesus transpacificus	delta smelt	FT/CT	Brackish water within the Sacramento-San Joaquin estuary	Low
Oncorhynchus mykiss	Central Valley steelhead	FT	Streams, rivers, lakes in Sacramento River basin	Low

Scientific Name	Common Name	Status	Habitat Type	Potential To Occur
Oncorhynchus tshwytscha	Central Valley spring-run Chinook salmon	FT	Sacramento River and its tributaries, primarily Butte, Big Chico, Deer and Mill Creeks	Low
Pogonichthys macrolepidotus	Sacramento splittail	CSC	Slow moving sections, dead end sloughs with flooded vegetation for spawning and foraging. Confined to delta, Suisun Bay, and associated marshes	Low
Birds				
**Agelaius tricolor*	tricolored blackbird	CSC	Nest in dense colonies in emergent marsh vegetation with water at or near the nesting colony; habitat must be large enough to support 50 pairs; requires large foraging areas with insects	Moderate – not observed in the project area; irrigation canal immediately south of site may provide low quality nesting habitat and nearby alfalfa fields could also provide foraging habitat, but linear nature of emergent marsh vegetation and blackberry brambles is marginal habitat and will not support enough tricolored blackbird pairs to have a successful nesting colony.
**Athene cunicularia*	burrowing owl	CSC	Open, dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals, such as ground squirrels	Moderate – not observed in the project area; suitable habitat for foraging and nesting (ground squirrel burrows present) occurs in areas with non-native annual grassland habitat
Buteo swainsoni	Swainson's hawk	CT	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, grain fields	High – observed in project area; suitable nest trees and foraging habitat present within ¼–mile of the proposed laydown areas

Scientific Name	Common Name	Status	Habitat Type	Potential To Occur
Elanus leucurus	white-tailed kite	CFP	Nests in a variety of tree species associated with low grasslands, agricultural areas, oak savannas, and other open areas suitable for foraging	High – observed on site; nest observed adjacent to proposed lay down areas during surveys
**Laterallus jamaicensis coturniculus*	California black rail	CT, CFP	Salt and freshwater marshes with dense vegetation	Moderate – not observed in project area; irrigation canal immediately south of site may provide low quality habitat; known from nearby White Slough

Source: (NCPA 2008a, CDFG 2009, USFWS 2008, CNPS 2009)

*** =** Suitable habitat present in project area though not observed during surveys

Status Key

State Status
CE = State listed as Endangered
CT = State listed as Threatened
CSC = California Species of Concern
CFP = California DFG Fully Protected Species

Federal Status
FE = Federally listed as Endangered
FT = Federally listed as Threatened
FC = Candidate for Federal listing

California Native Plant Society (CNPS) Status
List 1B = Plants considered rare, threatened, or endangered in California, but elsewhere
List 2 = Plants considered rare, threatened, or endangered in California, but more common elsewhere

Potential to Occur
High = Suitable habitat is present within the proposed site; occurrence records exist for species in proximity to the site; species expected to occur on site
Moderate = Low-quality suitable habitat is present within or near the proposed site; species was not identified during reconnaissance surveys of the site; species not expected to occur
Low = Suitable habitat is not present on site; species not expected to occur

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Identifying the threshold for determining significance is based on the biological resources present or potentially present within the project area in consideration of the proposed project description. A proposed project would have a significant impact to biological resources, if it would:

- Have an adverse impact, either directly through take, or indirectly through habitat modification or interruption of migration corridors, on any state- or federally-listed species;
- Have an indirect or direct adverse effect on any sensitive natural community identified in federal, state or local plans, policies, or regulations;
- Interfere with the movement of any native wildlife species (resident or migratory) or with established native wildlife (resident or migratory) corridors; or

- Conflict with applicable federal, state, or local laws, ordinances, regulations, and standards protecting biological resources, as listed in **Biological Resources Table 1.**

DIRECT/INDIRECT IMPACTS AND MITIGATION

According to California Environmental Quality Act (CEQA) Guidelines, direct impacts are a result of construction or operation of the project and occur at the same time and place as project activities. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance from the project site, but are reasonably foreseeable and project-related. This section analyzes the potential for direct and indirect impacts of construction and operation of the proposed project to biological resources and provides mitigation, as necessary, in an effort to reduce the severity of potentially adverse impacts.

Applicant-proposed impact avoidance and minimization measures have been incorporated into the project description and considered part of the proposed project in an effort to reduce impacts to biological resources. These measures are separate from staff's proposed conditions of certification. Following is a list of applicant-proposed impact avoidance and minimization measures as provided in the AFC (NCPA 2008a) and responses to staff's data requests (NCPA 2008f):

General mitigation measures include the following:

- Best management practices will be used to ensure no storm water, debris, or chemicals are discharged from the work area into the irrigation canal; and
- All work areas, equipment, spoils, vehicles, and personnel will remain in designated work, laydown, and parking areas.

Construction Impacts and Mitigation

The proposed project consists of various components related to the generation and transmission of electricity, including:

- **Power Plant Site.** The proposed LEC site would permanently occupy 4.4 acres within a 1,040-acre parcel owned by, and incorporated into, the city of Lodi. 0.93 acre within the 4.4 acres is non-native annual grassland. The proposed LEC is a combined-cycle nominal 296-megawatt power generation facility consisting of a Siemens STG6-5000F, natural gas fired combustion turbine generator, a single condensing steam turbine generator, a 7-cell cooling tower, and associated balance-of-plant equipment.
- **Laydown Areas.** The four construction laydown areas, which include equipment staging and parking, would be located in various places relative to the City of Lodi White Slough Water Pollution Control Facility (WPCF). Laydown Area A is located at the northeast corner of the WPCF, whereas Laydown Areas B through D are located immediately south of the WPCF and east of the proposed LEC plant. The 9.8-acre laydown areas would be within the same city of Lodi property as the LEC and is disturbed open space land with minimal landscaping with various trees and mowed non-native annual grassland understory or is currently used for parking and

temporary storage of equipment, soil, and debris. Since the laydown areas are considered temporary impacts, it is anticipated that these areas will return to pre-project conditions once construction is complete.

- **Electric Interconnection.** Electricity generated from the LEC would be interconnected to the PG&E transmission grid through the existing NCPA Combustion Turbine Project #2 (STIG) power plant's 230-kV switchyard via a new 520-foot overhead three-phase 230-kV generator tie line. The 230-kV conductors would be supported by two 73-foot tall monopole structures. The transmission line would extend from the northwest corner of the proposed LEC site west to the north end of the existing STIG power plant's 230-kV switchyard. The impacts from the electric interconnection are permanent and will affect an already disturbed/developed area between the north edge of the STIG power plant and the water treatment ponds.
- **Natural Gas Pipeline.** The proposed project includes a 2.7-mile natural gas supply pipeline that would be installed underground, east of the LEC site through the south end of the WPCF crossing proposed Laydown Area C, along road utility easements and a drainage ditch, crossing agricultural fields near rural residences and an open farm area. Construction primarily will be the open-trench method with a construction corridor of 35 feet or less. Depending on the type of soils encountered, the optimal trench for pipeline installation would require a width of approximately 24 inches and a depth of 48 inches. If loose soils are encountered, a trench up to 8 feet wide at the top and 2 feet wide at the bottom may be required. With a maximum construction corridor of 35 feet and a proposed pipeline of approximately 2.4 miles (12,672 feet), east of the LEC site, the total maximum temporary disturbance from pipeline trenching alone would be 10.2 acres (35 feet x 12,672 feet = 443,520 square feet = 10.2 acres). A graveled 1.1-acre temporary laydown area is proposed on the west side of North Thornton Road along the south side of the proposed pipeline route (CH2MHILL 2009e). The total temporary disturbance from trenching the gas pipeline and the laydown area would be 11.3 acres (10.2 acres + 1.1 acres). Approximately 0.8 mile of the proposed gas pipeline will occur in agricultural fields, while the remaining 1.9 miles will occur almost entirely within existing developed areas, graveled areas, paved farm access roads, and paved roads. For purposes of the SJMSCP, impacts to dirt access roads, graveled and developed areas, and paved roads do not need to be compensated. Therefore, only impacts to the agricultural fields from the proposed gas pipeline construction, which is estimated to be 3.55 acres, would require compensation at a 1:1 mitigation ratio. This will be discussed in greater detail under the **CONSTRUCTION IMPACTS TO VEGETATION** section below. The pipeline route occurring in the agricultural fields would be restored to agricultural use once construction is complete.

The proposed project would result in temporary disturbance along the proposed 2.7-mile gas pipeline in agricultural fields and in the already disturbed open space land for the laydown areas. Temporary disturbance includes short-term impacts during construction of the power plant and pipeline installation. Each of these activities would cause the removal of existing vegetation and disturbance of surface soils. Permanent disturbance would occur with the installation of the LEC and the new pole foundations for the electrical interconnection within already disturbed/developed areas adjacent to the LEC site.

Construction Impacts to Vegetation

Construction impacts to vegetation may occur in a variety of ways, including the direct removal of plants during the course of construction. As these impacts are generally localized and are primarily temporary in nature, they are not usually considered significant unless the habitat type is regionally unique or is known to support special-status species. Including the acreage of the temporary laydown area along the proposed gas pipeline, construction activities would result in the disturbance of approximately 25.5 acres of land (consisting of agricultural areas and already developed/disturbed areas): an estimated 21.1 acres would be temporarily disturbed (11.3 acres + 9.8 acres) and approximately 4.4 acres would be permanently disturbed. 5.9 acres of the LEC site is considered GGS habitat, whereas 3.55 acres along the pipeline route is considered Swainson's hawk habitat (CH2MHILL 2009e). The proposed project site is located within an already developed/disturbed area, with permanent impacts to native trees near the swale at the southwest corner of the LEC site. The SJCOG, Inc., (SJCOG) Joint Powers Authority (JPA) approved the SJCOG Habitat Technical Advisory Committee (HTAC) recommendation that mitigation for impacts to 5.9 acres of GGS habitat and 3.55 acres of Swainson's hawk habitat be compensated by acquiring the conservation easement for SJCOG for the 21.25-acre mitigation land (5.9 acres x 3:1 mitigation ratio = 17.7 acres; 3.55 acres x 1:1 mitigation ratio = 3.5 acres; 17.7 acres + 3.5 acres = 21.25 acres) located on city of Lodi property immediately east of the White Slough Wildlife Preserve. Including staff's conditions of certification, mitigation for the variance would offset impacts to biological resources to less-than-significant levels. Installation of the proposed gas pipeline would be mitigated by restoring the site to agricultural use once installation is complete.

Construction Impacts to Wildlife

Direct loss of small mammals, reptiles, and other less mobile species could occur during project construction. This would result primarily from the use of construction vehicles and the grading of the project site and laydown areas. Fossorial species, such as small burrowing animals (lizards, snakes, and small mammals), may be harmed through the crushing of burrows, loss of refugia from predators, and direct mortality from construction activities. Construction activities and human presence can also alter or disrupt the breeding and foraging habitat for common wildlife species.

Wildlife may become entrapped in open trenches during construction of the LEC or installation of the natural gas pipeline. As an impact avoidance and minimization measure, the applicant would set up wire backed silt fences around construction zones to prevent the entrapment of wildlife. Additionally, staff recommends implementation of proposed Condition of Certification **BIO-8** (Mitigation Management to Avoid Harassment or Harm) which would also require the installation of escape ramps within open trenches, inspection of trenches for trapped animals, or covering open trenches at night. Implementation of these measures is expected to mitigate adverse impacts to wildlife.

Birds may nest on the ground, in the trees or other vegetation, which are proposed for disturbance and/or removal to construct the LEC. With the exception of a few species, nesting passerines and raptors are protected under the Migratory Bird Treaty Act (MBTA) and are also offered protection by Fish and Game Code, section 3503. Impacts to nesting species would be considered significant without mitigation. To reduce impacts

to breeding birds and ensure compliance with the MBTA and other LORS, the applicant has proposed conducting pre-construction surveys. Additionally, staff recommends implementation of proposed Condition of Certification **BIO-12** (Pre-Construction Nest Surveys and Impact Avoidance for Migratory Birds) in which the Designated Biologist will monitor and establish a no-disturbance zone around active nests should construction be scheduled while nests are active. Implementation of these measures is expected to mitigate adverse impacts to nesting birds that may occur in the project area.

Construction Impacts to Special-Status Species

Special-Status Plants

Special-status plant species are not expected to occur in the proposed project area. As previously described, California Natural Diversity Database (CNDDB) and CNPS databases identified eight plant species that are known to occur within the vicinity of the proposed project. However, there were no occurrences of any special-status plant species seen during the surveys. There is no suitable habitat within the proposed LEC site due to ongoing disturbance due to industrial and adjacent agricultural operations. Therefore, significant adverse impacts to special-status plant species are not expected to occur from construction of the proposed project.

Wildlife

Several special-status wildlife species were identified that are known to utilize the surrounding agricultural habitat and thus have potential to occur in the proposed project area. These species include tricolored blackbird, burrowing owl, Swainson's hawk, white-tailed kite, California black rail, western pond turtle, northwestern pond turtle, and giant garter snake. Of these, white-tailed kite and Swainson's hawk were observed during 2008 field surveys, with the white-tailed kite observed nesting on-site. Due to the limited or marginal habitat available on-site and adjacent off-site areas, the tricolored blackbird and California black rail are not expected to occur. These two bird species will be discussed in greater detail below.

Critical habitat is a formal designation under the Federal Endangered Species Act where specific areas are designated as essential to the conservation and recovery of a federally listed species. These areas may require special management consideration or protection. The project area is located within designated critical habitat for delta smelt (*Hypomesus transpacificus*), but the project would not affect any creeks, drainages, wetlands, or other aquatic resources. Appropriate soil erosion and sediment controls will be implemented on-site to prevent construction materials and/or activities from entering aquatic resources (NCPA 2008a). Proposed Conditions of Certification **SOIL & WATER-1**, in which the applicant is to develop and implement a construction Storm Water Pollution Prevention Plan, and **SOIL & WATER-2**, in which the applicant obtains the Compliance Project Manager approval for a site-specific drainage, erosion, and sediment control plan, will outline soil erosion and sediment control measures. (For more details, see the **SOIL AND WATER RESOURCES** section of this Staff Assessment.)

Tricolored blackbird is a California Species of Concern that is a permanent resident in the Central Valley. This species is diurnal and crepuscular, and is a colonial nester. The

three basic requirements for the selection of breeding colony sites are: (1) open accessible water; (2) protected nesting substrate which is usually either flooded or prickly vegetation; and (3) suitable foraging space providing adequate insect prey within a few kilometers of a nesting colony (Beedy 1989) such as open agricultural fields. A successful breeding colony must be able to support upwards of 50 breeding pairs. Suitable foraging habitat in adjacent agricultural fields is present. Also emergent marsh vegetation along the irrigation canal immediately south of the site and a small patch of Himalaya blackberry on the south end of the proposed LEC site does provide marginal nesting habitat for the tricolored blackbird. Due to the patchy linear nature of the emergent marsh vegetation and Himalaya blackberry brambles along the irrigation canal, and the small size of the Himalaya blackberry patch on-site, suitable nesting habitat large enough to support a breeding colony does not occur. Tricolored blackbirds were not present during the April 30, 2008 survey. If present, the tricolored blackbirds would have been nesting, which typically begins late March to early April (Beedy and Hamilton 1999). There are no CNDDB records for tricolored blackbird within five miles of the proposed project (CDFG 2009). Significant adverse impacts to tricolored blackbird are not expected to occur from construction of the proposed project with the implementation of staff's proposed Conditions of Certification: **BIO-8** (Mitigation Management to Avoid Harassment or Harm) and **BIO-12** (Pre-Construction Nest Surveys and Impact Avoidance for Migratory Birds); **BIO-4** (Designated Biologist and Biological Monitor Authority) in which the Designated Biologist can call a halt to any activities that would be an adverse impact to biological resources; **BIO-5** (Worker Environmental Awareness Program) in which workers on the project site or any related facilities are informed about sensitive biological resources; **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan) which identifies all biological resources mitigation, monitoring, compliance measures, Conditions of Certification, and permits; and **BIO-7** (Impact Avoidance and Minimization Measures) in which all feasible measures which avoid or minimize impacts to the local biological resources are incorporated in any modification or finalization of project design.

California black rail is a California Threatened and a Fully Protected species that is a yearlong resident of dense emergent marsh vegetation. This species is so secretive, that biologists usually listen for calls to detect their presence. This species is crepuscular and nocturnal though spontaneous vocalizations have been heard during the day. Black rails tend to be associated with areas where the taller bulrush (*Scirpus* spp.) and the shorter statured pickleweed (*Salicornia virginica*) border each other in the Bay area (Evens et al. 1991). Black rails need higher elevation marshes (damp ground and shallow water) with little annual and/or daily fluctuations in water levels. Salinity does not appear to be a major factor affecting the distribution of black rails in the delta as black rails are known to exist in marshes with low salinities and dense bulrush and cattails (*Typha* spp.) such as White Slough near the proposed LEC site (SJCOG 2000). Black rails forage on invertebrates, including snails, beetles, earwigs, grasshoppers, and ants, and seeds from bulrushes and cattails (Eddelman et al. 1994). The nearest CNDDB occurrence is approximately 0.5 mile west of the proposed project at the White Slough Wildlife Area. The irrigation canal immediately south of the project site connects to the White Slough Wildlife Area and provides marginal habitat at best for black rails. However, due to the limited amount of emergent marsh vegetation along the irrigation canal immediately south of the site, the intensive agricultural practice of irrigation nearby fields, and fluctuating water levels in the canal, black rails are not expected to

occur in the off-site canal. Significant adverse impacts to black rail are not expected to occur from construction of the proposed project with the implementation of staff's proposed Conditions of Certification **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, and **BIO-12**.

Burrowing owl is a California Species of Concern that is a yearlong resident of open, dry grassland, prairie, or desert floor. This species is diurnal, crepuscular, and nocturnal and is thought to be semi-colonial. Burrowing owl is known to occur in urban areas, disturbed areas, and at the edges of agricultural fields and typically hunts from a perch or hops after prey on the ground. Burrowing owls tend to inhabit ground squirrel burrows, which increases habitat suitability for this special-status species on the proposed project site. The open grassland areas and edges of agricultural fields provide suitable habitat for this species. The nearest CNDDB element occurrence is approximately 3.5 miles south of the proposed project (CDFG 2009). The applicant has proposed the following impact avoidance and minimization measures:

- Preconstruction surveys within 14 days prior to the start of construction; and
- In the event that owls or owl sign are identified in the survey, the applicant has proposed the following:
    - Location(s) of owls or owl sign will be mapped and noted. In the event an active burrow would be affected by the project, replacement burrows will be constructed at a location approved by the HTAC and passive relocation of the owls will occur prior to the start of construction. Passive relocation would only occur during the non-breeding season (September 1 to January 31); and
    - If an active nest is found during the breeding season, a 250-foot buffer area will be established around the burrow site until the fledglings are capable of independent survival. In the event such a buffer is not practicable, alternative mitigation measures will be determined in consultation with the HTAC.

Implementation of staff's proposed conditions of certification will further avoid and mitigate potentially adverse impacts to burrowing owl: **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, **BIO-12**, and **BIO-10** (Burrowing Owl Mitigation). This includes implementation of all mitigation and impact avoidance measures outlined in CDFG's (1995) *Staff Report on Burrowing Owl Mitigation*. The HTAC has approved the applicant's proposed impact avoidance and minimization measures, which has been incorporated in staff's proposed Condition of Certification **BIO-10.** Implementation of staff's proposed conditions of certification is sufficient to mitigate impacts to burrowing owl to less-than-significant levels.

Swainson's hawk is a California Threatened species that requires large amounts of foraging habitat, preferably grassland or pasture habitats. Preferred prey items are voles, gophers, birds, and insects such as grasshoppers (Estep 1989). This diurnal species has adapted to the use of some croplands, including alfalfa, hay, grain, tomatoes, beets, and other row crops (Estep 1989). Alfalfa, hay, row crops, and a small area of vineyards surround the proposed project area. Though vineyards are not suitable due to a lack of suitable prey or the prey is unavailable to the hawks due to the crop structure, foraging habitat in the alfalfa fields or harvested row crops where the visibility and number of prey items is high makes up the majority of the agricultural land use around the project area. During 2009 Swainson's hawk nest surveys, five active

nests were observed within 0.5 mile of the proposed project site and gas pipeline (CH2MHILL 2009e). It is estimated that 3.55 acres of agricultural fields, which are considered Swainson's hawk habitat, would be impacted by the construction of the proposed gas pipeline. The applicant has proposed the following impact avoidance and minimization measures:

- Complete protocol level surveys for Swainson's hawks following the guidelines established by the Swainson's Hawk Technical Advisory Committee (CDFG 2000). Surveys will be completed during two survey periods between March 20 and April 20; and
- In the event that a nest is identified, the applicant has proposed the following:
    - If an active nest is identified or a nest tree becomes occupied during construction activities, then all construction activities shall remain a minimum of two times the drip line of the tree, measured from the nest, per San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) (SJMSCP 2000);
    - If project activities that may cause nest abandonment or forced fledging are necessary within the buffer zone, a CDFG-approved biologist will monitor the site to evaluate whether the construction activities are disturbing the nesting hawks; and
    - If the nesting hawks appear distressed, the monitor shall halt all construction activities and the project proponent will consult with the HTAC to determine the appropriate actions to avoid nest abandonment.
- Compensation for the loss of approximately 3.55 acres of agricultural land, which is considered Swainson's hawk habitat, according to habitat mitigation requirements of the SJMSCP in consultation with the HTAC. Compensation has been agreed to at a 1:1 mitigation ratio totaling approximately 3.55 acres (CH2MHILL 2009e).

Implementation of staff's proposed conditions of certification will further avoid and mitigate potentially adverse impacts to Swainson's hawk: **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, **BIO-12**, and **BIO-11** (Swainson's Hawk Mitigation). This includes mitigation measures consistent with *The Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFG 1994). In addition, the SJMSCP requires a one-time endowment fee of $4,603.74 per acre for the actual acres impacted by the proposed project. The one-time endowment fee for the impacting 3.55 acres of Swainson's hawk habitat is expected to be $16,342.68 (3.55 acres x $4,603.74 = $16,342.68). Implementation of staff's conditions of certification and approved mitigation measures and compensation required by the SJMSCP are sufficient to mitigate impacts to Swainson's hawk to less-than-significant levels. The mitigation land is immediately east of the White Slough Wildlife Preserve.

White-tailed kite is a California Fully Protected species that is a yearlong resident of the Central Valley, coastal range, and foothills. This species is diurnal and crepuscular and outside breeding season, roosts communally (Dunk 1995). White-tailed kite inhabits open grasslands, agricultural areas, and savannah-like habitats with abundant prey such as small rodents and insects. Nesting by white-tailed kites has been reported for the months of February through August with peak activity occurring in March through

May. Nesting sites include trees of Moderate heights such as eucalyptus, oaks, and cottonwood. A white-tailed kite nest was observed in a Scotch pine tree on the side of Laydown Area D during the April 30, 2008 survey. Additionally, the nearby agricultural areas provide foraging habitat for this species. There are no CNDDB records within a five-mile radius of the proposed project (CDFG 2009). The applicant has proposed the following impact avoidance and minimization measures:

- Preconstruction surveys within 30 days prior to the start of construction; and
- In the event that an active nest is identified in the survey, the applicant has proposed that clearing and construction within 100 feet of the nest will be postponed until it is vacated and the juveniles have fledged.

These measures are consistent with the SJMSCP. Reduction of buffers would require consultation and approval from the HTAC. In addition implementation of staff's proposed Conditions of Certification **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, and **BIO-12**, are necessary to ensure that impacts to white-tailed kite are mitigated to less than significant levels.

Giant Garter Snake, a California and Federally Threatened Species, utilizes freshwater marshes, sloughs, ponds, and other aquatic habitats such as irrigation canals, drainages, reservoirs, and rice fields during the spring-through-fall active season. During its winter dormancy period, GGS typically occupy small mammal burrows and soil crevices in higher elevation uplands not subject to flooding. Most activity is diurnal with limited crepuscular and nocturnal activity during the summer (USFWS 1999). The nearest CNDDB occurrence of GGS has been reported approximately 0.5 mile northwest of the LEC project site, and the SJMSCP has identified White Slough Wildlife Area (Hansen 1996; SJCOG 2000) and the adjacent Shin Kee and Rio Blanco Tracts as known occupied habitat (SJCOG 2000). The vegetated irrigation canal immediately south of the project site and connected to the White Slough Wildlife Area provides suitable habitat for GGS and could occur incidentally in the adjacent uplands within the project site and associated laydown areas.

The SJMSCP requires a 200-foot setback from potential GGS habitat with no vegetation removal within the setback. The south end of the LEC project site including the swale area, Laydown Area C, southern end of Laydown Areas B and D, and approximately 1,200-foot segment of the natural gas pipeline would be within the required 200-foot setback. A recommendation by the HTAC for a variance to reduce the 200-foot setback to a 30-foot buffer has been approved by the JPA (SJCOG 2009). The reduction in the 200-foot setback is necessary as this would restrict the eventual footprint of the proposed LEC power plant, would limit the use of Laydown Areas B and D, and would restrict the use of Laydown Area C. The applicant proposes the following impact avoidance and minimization measures:

- Maintain a 30-foot buffer area from the edge of the irrigation canal;
- To the maximum extent possible, construction activities associated with vegetation removal, initial ground disturbance, and grading would be completed during the active season for the GGS between May 1 and October 31. Any ground disturbance outside of this window would only proceed once authorized by the HTAC.

- The buffer area will be clearly identified with temporary fencing and signs will be installed demarking the area as environmentally sensitive. Wire backed silt fencing will be installed prior to any ground disturbance to prevent snakes and other wildlife from entering the work areas.
- A qualified biologist will conduct preconstruction surveys of the area within 24 hours of ground disturbance. Additional preconstruction surveys will be conducted if construction activities have stopped for more than two weeks.
- A biological monitor will be on site during the initial clearing and grading of all areas within 200 feet of the canal. In the event a snake is observed, all activity will immediately cease until the snake has exited the work area on its own or until other appropriate corrective measures have been taken to ensure that no harm will come to the snake. Any incidental sightings will be immediately reported to the USFWS.
- Compensation for the loss of approximately 5.90 acres of upland habitat for the GGS according to habitat mitigation requirements of the SJMSCP in consultation with the HTAC. Mitigation for the loss of 5.9 acres has been agreed to a 3:1 habitat compensation ratio totaling approximately 17.7 acres (CH2MHILL 2009).

Implementation of staff's proposed conditions of certification will further avoid and mitigate potentially adverse impacts to GGS: **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, and **BIO-9** (Giant Garter Snake Habitat Compensation), in which impact avoidance and minimization measures for construction activities in GGS habitat are implemented and compensated. Implementation of staff's proposed conditions of certification and the approved mitigation measures and provisions for incidental take stated in the USFWS (2009) letter dated October 22, 2009, titled *Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to Multiple Applicants for a Multiple-Species Habitat Conservation Plan for San Joaquin County, California* (Service File 1-1-00-F0231) are sufficient to mitigate impacts to GGS to less-than-significant levels. The USFWS letter appended the LEC project to the SJMSCP and has been approved by the HTAC, JPA, and the SJCOG in Minute Resolution Number 09-03 (SJCOG 2009). The 21.25 acre mitigation land is immediately east of the White Slough Wildlife Preserve and is considered by USFWS as higher quality habitat than what will be affected by the project (USFWS 2009). In addition, the SJMSCP requires a one-time endowment fee of $4,603.74 per acre for the actual acres impacted by the proposed project. The one-time endowment fee for the impacting 5.9 acres of GGS upland habitat is expected to be $27,161.06 (5.9 acres x $4,603.74 = $27,161.06). The applicant agrees to pay the appropriate endowment fee.

Northwestern and western pond turtles are California Species of Concern that are found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. Logs, rocks, mats of floating vegetation, and open mud banks are required for basking. Turtles slip from basking sites to underwater retreats when they feel threatened. Turtles estivate during summer droughts and hibernate in colder areas by burying itself in bottom mud. Most activity is diurnal, although crepuscular and nocturnal activity has been observed (Zeiner et al. 1988–1990). Females move overland usually along stream or pond margins to dig a nest during the spring and early summer. The nearest occurrence of the northwestern pond turtle is approximately 1.7 miles southwest of the

project site in Telephone Cut along the north side of Bishop Tract. The western pond turtle has been reported approximately 0.7 miles to the northwest of the project site. There is no suitable aquatic habitat in the project area; however, the irrigation canal immediately south of the project site provides suitable habitat for these species. They could also occur incidentally in the adjacent upland areas of the project site, so there is the potential for adverse impacts to individuals to be directly impacted during project construction. The applicant has proposed the following impact avoidance and minimization measures:

- Preconstruction surveys conducted concurrently with GGS to locate potential pond turtles and potential nest locations within 24 hours of ground disturbance;
- Installation of temporary fencing along the edge of the irrigation canal and posting of signs identifying the area as environmentally sensitive; and
- In the event a turtle or nest is identified in the work area, the location will be noted and the CDFG will immediately be contacted to determine the appropriate mitigation and avoidance measure to be taken prior to the start of any ground disturbance within 300 feet of the nest.

The SJMSCP requires a 300-foot setback from any known pond turtle nest sites from April to November. Reduction of the setback to a 30-foot buffer was recommended by the HTAC and approved by JPA when the GGS variance was granted (May 2009). The applicant's proposed impact avoidance and minimization measures will be incorporated into staff's proposed Condition of Certification **BIO-13** (Northwestern and Western Pond Turtle Mitigation). In addition, implementation of staff's proposed Conditions of Certification **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, and **BIO-8,** are necessary to ensure that impacts to northwestern and western pond turtles are mitigated to less-than-significant levels.

Migratory birds and resident native birds such as killdeer and red-tailed hawks were observed nesting either on the proposed LEC site or in the project area during 2008 surveys. Though many of the native birds are not special-status species, these birds are protected under the federal Migratory Bird Treaty Act (MBTA), which prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. Implementation of staff's proposed Conditions of Certification **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, and **BIO-12** would reduce the impacts to native birds to less than significant levels.

General Construction Impacts

Construction activities have the potential to create a variety of temporary impacts to biological resources including:

- **Noise:** Construction activities would result in a short-term temporary increase in the ambient noise level. Such activities have the potential to disrupt the nesting, roosting, or foraging activities of local wildlife. However, the existing NCPA Combustion Turbine Project #2 (STIG) power plant, city of Lodi White Slough Water Pollution Control Facility (WPCF), traffic on Interstate 5, and intensive agricultural operations in the immediate vicinity of the proposed LEC site create an elevated ambient noise level to which local wildlife species have acclimated. As such,

construction noise is not expected to adversely impact biological resources. (For a complete discussion of noise impacts, see the **NOISE** section of this Staff Assessment.)

- **Lighting:** Construction is scheduled to occur from 6 a.m. to 11 p.m. with additional hours necessary to make up schedule deficiencies or to complete critical construction activities (NCPA 2008a). To facilitate nighttime construction activities, to the extent feasible and consistent with worker safety codes, the lighting will be directed toward the center of the construction site and shielded to prevent backscatter. There may be limited times during the 24-month construction period when the project site may appear as a brightly lit area, but due to the limited duration of these effects, the excess lighting would not significantly impact wildlife in the vicinity of the proposed LEC site. Additionally, the existing WPCP and STIG facilities provide an elevated ambient level of lighting to which local wildlife, including nocturnal species, have acclimated. (For a complete discussion of visual resource impacts, see the **VISUAL RESOURCES** section of this Staff Assessment.)

Operation Impacts and Mitigation

Potential impacts resulting from operation of the LEC include avian collision with and/or electrocution by the electric interconnection facilities and disturbance to wildlife due to increased noise and lighting.

Avian Collision and Electrocution

The proposed project includes a 150-foot exhaust stack, a 105-foot heat recovery steam generator, and two 73-foot monopole support towers. The proposed transmission tower structures will support 520 feet of new transmission lines that will tie the plant to the existing STIG power plant 230-kV switchyard.

Bird collisions with power lines and transmission structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and migrating birds are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled or are fleeing danger. Collisions are more probable when transmission lines are located near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1996); these features are not present near the proposed project area. Therefore, staff concludes that the LEC transmission structures would not pose a significant collision threat to resident or migratory bird populations.

Large perching birds such as red-tailed hawk, Swainson’s hawk, and white-tailed kite, are susceptible to transmission line electrocution. Because raptors and other large birds often perch on tall structures that offer optimal views of potential prey, the design characteristics of transmission poles are a major factor in raptor electrocutions (APLIC 1996). Electrocution occurs only when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission pole with insufficient clearance between these elements. Raptor species that utilize the towers for nesting could be electrocuted while landing. Furthermore, nests may be built in areas that are

susceptible to electrical charges that may result in fire as well as an electrical outage. However, the majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1-kV and 60-kV, and "the likelihood of electrocutions occurring at voltages greater than 60-kV is low" because phase-to-phase and phase-to-ground clearances for lines greater than 60-kV are typically sufficient to prevent bird electrocution (APLIC 2006). The proposed LEC transmission lines would be 230-kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to minimize bird electrocutions. However, the following measure is proposed to ensure adequate spacing of phase conductors.

Potential impacts to wildlife resulting from electrocution by transmission lines may be mitigated by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (see staff's proposed Condition of Certification **BIO-7**). Specifically, the phase conductors shall be separated by a minimum of 60 inches. In addition to the aforementioned separation requirements, Condition of Certification **BIO-7** requires that bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible. With implementation of this mitigation, significant avian mortality due to electrocution by LEC transmission structures is not expected to occur.

Noise

Wildlife species near the proposed LEC are accustomed to elevated ambient noise levels as a result of the existing STIG power plant, WPCF, traffic on Interstate 5, and intensive agricultural operations. Although operation of the LEC would create additional noise, significant impacts to wildlife are not expected.

Light

Existing energy facilities adjacent to the proposed LEC site provide an elevated ambient level of lighting to which local wildlife, including nocturnal species, have acclimated. Although operation of the LEC would create additional light, significant impacts to wildlife are not expected.

Hazardous Materials

An accidental release of hazardous materials such as anhydrous ammonia and sodium hypochlorite has the potential to negatively impact sensitive biological species if these species are found on the proposed project site or nearby. The probability of a hazardous materials spill occurring at LEC is extremely low. Staff has determined that appropriate procedures will be in place to address any disposal and/or treatment of hazardous materials on the proposed project site – more information about these standard procedures are addressed in the **HAZARDOUS MATERIALS** and **WASTE MANAGEMENT** sections of this staff assessment. Due to the lack of sensitive biological resources on site and the extremely low probability of a catastrophic hazardous materials spill, staff concludes there will be no significant impact to biological resources associated with hazardous materials.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts are those that result from the incremental impacts of an action considered with other past, present, and reasonable foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

The LEC would impact approximately 5.90 acres of upland habitat for the GGS and 3.55 acres of agricultural fields, which are considered Swainson's hawk habitat. Habitat mitigation for GGS and impact to agricultural land are required by the SJMSCP. A variance from standard SJMSCP impact avoidance and minimization measures has been approved by the HTAC in which SJCOG will hold a conservation easement for 21.25 acres of compensation land owned by the city of Lodi. This land is immediately east of the White Slough Wildlife Preserve and is considered by USFWS as higher quality habitat than what will be affected by the project (USFWS 2009). In addition to the proposed LEC, there are ongoing improvements at the adjacent WPCF. There are no other projects proposed within four miles of the LEC that will affect areas designated as agriculture and open space (NCPA 2008a). A total of 72 projects located throughout San Joaquin County may decrease open space (NCPA 2008a). The construction of these projects throughout the County would adversely affect the special-status species due to increased habitat destruction and fragmentation. However, agricultural production throughout the County has already created very fragmented habitats. The LEC would be constructed on what is currently an already developed/disturbed area so minimal open space acreage will be affected. The applicant's participation in the SJMSCP for the proposed project is intended to address long-term impacts to covered special-status species and will mitigate cumulative impacts to these species to a less than significant level.

COMPLIANCE WITH LORS

The proposed project must comply with state, federal, and county laws, ordinances, regulations, and standards that address state and federally listed species, as well as other sensitive species, and their habitats. In San Joaquin County, the SJMSCP provides guidance for protection of sensitive wildlife and plant communities in the San Joaquin County region (SJCOG 2000). For the San Joaquin Valley, PG&E has developed a Habitat Conservation Plan (HCP) for routine operations and maintenance activities to comply with federal and state Endangered Species Act (Jones & Stokes 2006). The applicant had been researching the possibility of participating in PG&E's HCP for the 2.7-mile natural gas pipeline portion of the proposed project. The HCP does not cover linear pipeline projects over one mile in length, therefore, the applicant will participate in the SJMSCP for the entire LEC project.

For compliance with the SJMSCP, the applicant proposed mitigation for a variance on the required 200-foot setback for GGS habitat. The Energy Commission permitting authority supersedes that of any State or local regulatory agency per the Warren Alquist Act (section 25500). Staff has recommended mitigation measures and conditions of certification which may not necessarily meet the requirements of the California Endangered Species Act. The HTAC, consisting partly of SJCOG's Habitat Planners and representatives from the USFWS and California Department of Fish and Game

(CDFG), has approved the mitigation for the variance. Implementation of staff's proposed conditions of certification which incorporate various HTAC required mitigation measures will result in the LEC project being in compliance with all state, federal, and local LORS.

Biological Resources Table 3 outlines the LORS and staff's conclusion regarding whether or not the LEC would be in compliance with the LORS for this Staff Assessment.

Biological Resources Table 3
Laws, Ordinances, Regulations, and Standards Compliance

Applicable Law	Description
Federal	
Endangered Species Act	Yes – the variance on the GGS 200-foot setback has been approved to allow a 30-foot buffer and 21.25 acres of mitigation lands will be held in a conservation easement by SJCOG in exchange for impacting 5.9 acres of GGS habitat and 3.55 acres of Swainson's hawk habitat. The applicant will install temporary barrier fencing identifying areas as environmentally sensitive and will conduct preconstruction surveys.
Migratory Bird Treaty Act	Yes – if the applicant installs temporary barrier fencing around burrowing owl burrows and nests of tree and ground dwelling birds, follows Avian Power Line Interaction Committee (APLIC) guidelines.
Clean Water Act	Yes – if the applicant implements proposed Conditions of Certification **SOIL & WATER-1** and **SOIL & WATER-2** in the **SOIL AND WATER RESOURCES** section of this Staff Assessment.
State	
California Endangered Species Act	Yes – the variance on the GGS 200-foot setback has been approved to allow a 30-foot buffer and 21.25 acres of mitigation lands will be held in a conservation easement by SJCOG in exchange for impacting 5.9 acres of GGS habitat and 3.55 acres of Swainson's hawk habitat. The applicant will install temporary barrier fencing identifying areas as environmentally sensitive and will conduct preconstruction surveys.
California Code of Regulations	Yes – the applicant has listed the plants and animals that are classified as rare, threatened, or endangered for the project area.
Fully Protected Species	Yes – if the applicant installs temporary barrier fencing around white-tailed kite and California black rail nests.

Applicable Law	Description
California Native Plant Protection Act of 1977	Yes – there are no California listed plants that could be affected by this project.
Nest or Eggs	Yes – if the applicant installs temporary barrier fencing around burrowing owl burrows and nests of tree and ground dwelling birds.
Migratory Birds	Yes – if the applicant installs temporary barrier fencing around burrowing owl burrows and nests of tree and ground dwelling birds, follows APLIC guidelines.
Significant Natural Areas	Yes – the variance on the GGS 200-foot setback has been approved to allow a 30-foot buffer and 21.25 acres of mitigation lands will be held in a conservation easement by SJCOG in exchange for impacting 5.9 acres of GGS habitat and 3.55 acres of Swainson's hawk habitat. The applicant will install temporary barrier fencing identifying areas as environmentally sensitive and will conduct preconstruction surveys.
Local	
San Joaquin County Multi-Species Habitat Conservation and Open Space Plan	Yes – the variance on the GGS 200-foot setback has been approved to allow a 30-foot buffer and 21.25 acres of mitigation lands will be held in a conservation easement by SJCOG in exchange for impacting 5.9 acres of GGS habitat and 3.55 acres of Swainson's hawk habitat. The applicant will install temporary barrier fencing identifying areas as environmentally sensitive and will conduct preconstruction surveys.
San Joaquin County General Plan	Yes – the LEC will not impact significant oak groves, heritage trees, native oak trees, and riparian habitats in San Joaquin County.
Protection of City Trees, Shrubs, and Plants	Yes – the applicant will obtain authorization from the City of Lodi prior to the removal of any trees, shrubs, or plants within the LEC project area.

NOTEWORTHY PUBLIC BENEFITS

Construction and operation of the LEC would not result in any noteworthy public benefits with regard to biological resources.

CONCLUSIONS

Without mitigation, the proposed LEC project would result in significant adverse impacts to biological resources. The conditions of certification proposed in this Staff Assessment, including measures provided in the SJMSCP, are necessary to mitigate

impacts to biological resources to less than significant levels. The proposed LEC borders potential GGS habitat. The SJMSCP requires a 200-foot setback from the potential GGS habitat, which the applicant will not be able to maintain during construction. One laydown area, a 1,200-foot segment of the natural gas pipeline, and the southern end of two laydown areas and the LEC will be within the 200-foot setback.

A variance to reduce the setback to 30 feet from the environmentally sensitive area would impact 5.9 acres of GGS upland habitat associated with the 170-foot encroachment by the LEC project. The proposed gas pipeline would impact 3.55 acres of agricultural fields, which is considered Swainson's hawk habitat. To mitigate for these impacts, the project proponent proposed an in-lieu land swap at a compensation ratio of 3:1 for impacting 5.9 acres of GGS upland habitat and a 1:1 compensation ratio for impacting 3.55 acres of Swainson's hawk habitat, totaling 21.25 acres (17.7 acres + 3.55 acres = 21.25 acres). The mitigation land is owned by the city of Lodi and borders the eastern edge of White Slough Wildlife Preserve. The SJCOG will be granted a conservation easement for these mitigation lands and the City of Lodi will continue to own the property. A mitigation plan for a variance was reviewed and approved by the HTAC with concurrence by the Joint Powers Authority (JPA).

Staff has concluded that the proposed LEC project will not result in any significant unmitigated impacts to biological resources with implementation of staff's proposed conditions of certification and the mitigation plan for the variance approved by the HTAC.

PROPOSED CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval.

The Designated Biologist must at least meet the following minimum qualifications:

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

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

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

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

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. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan, to be submitted by the project owner;

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

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

5. 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 (i.e. parking lots) for animals in harm’s way;

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

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

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties are ceased as approved by the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

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

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the Conditions of Certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), WEAP and all permits.

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

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist and Biological Monitor(s), the project owner's Construction/ Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

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

2. Inform the project owner and the Construction/Operation Manager when to resume activities; and

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

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt 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-5 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 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 and electronic media 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 (for review and approval) and the SJCOG, Inc., (SJCOG) Habitat Technical Advisory Committee (HTAC) for review and comment, two (2) copies each of the proposed WEAP and all supporting written materials and electronic media 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. At least 10 days prior to site and related facilities mobilization submit two copies of the CPM approved materials.

The signed training acknowledgement forms from construction 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

BIO-6 The project owner shall submit two copies of the proposed Biological Resources Mitigation Implementation and monitoring Plan (BRMIMP) to the CPM (for review and approval) and to the HTAC (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:

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 as necessary to avoid or mitigate impacts;

3. All biological resources mitigation, monitoring and compliance measures required in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) terms and conditions, as approved by the HTAC;

4. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;

5. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;

6. All required mitigation measures for each sensitive biological resource;

7. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

8. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

9. 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;

10. 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;

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

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

13. All performance standards and remedial measures to be implemented if performance standards are not met;

14. A preliminary discussion of biological resources related facility closure measures;

15. Restoration and revegetation plan;

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 related 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 HTAC and approval by the SJCOG Joint Powers Authority (JPA), will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM and the HTAC within five (5) days of their receipt and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to the CPM.

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 and submitted to the HTAC to ensure no conflicts exist.

Implementation of BRMIMP measures will be reported in the Monthly Compliance Reports by the Designated Biologist (i.e. survey results, construction activities that were monitored, species observed). Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure 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.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-7 Any time the project owner modifies or finalizes the project design they shall incorporate all feasible measures that avoid or minimize impacts to the local biological resources, including:

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

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

3. Eliminate any California Exotic Pest Plants of Concern (Cal-IPC 2007) List A species from landscaping plans;

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

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

6. Use straw wattles or silt fences to prevent sediment from reaching irrigation and drainage canals;

7. Establish buffer zones around irrigation and drainage canals;

8. Fence buffer zones during construction to minimize habitat disturbance; and

9. Restore temporarily impacted areas to approximate original site conditions.

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

MITIGATION MANAGEMENT TO AVOID HARASSMENT OR HARM

BIO-8 The project owner shall implement the following measures to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to the local biological resources.

1. Install temporary fencing 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 U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG). Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals by the Designated Biologist or Biological Monitor;

2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week from the project site;

3. Prohibit feeding of wildlife by staff and subcontractors;

4. Prohibit non-security related firearms or weapons from being brought to the site;

5. Prohibit pets from being brought to the site;

6. Report all inadvertent deaths of special-status 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. The Sacramento USFWS Office shall be notified in writing within three working days of the accidental death or injury to giant garter snake during project related activities. Contact USFWS and CDFG for specific notification procedures;

7. Minimize use of rodenticides and herbicides in the project area and prohibit the use of chemicals and pesticides known to cause harm to amphibians. If rodent control must be conducted, zinc phosphide or an equivalent product shall be used; and

8. Construction activities associated with vegetation removal, initial ground disturbance, and grading would be completed during the active season for giant garter snake between May 1 and October 31.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the

Monthly Compliance Reports by the Designated Biologist. Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how all biological resource-related mitigation measures have been completed.

GIANT GARTER SNAKE HABITAT COMPENSATION

BIO-9 To mitigate impacts to the giant garter snake and its habitat, the project owner shall implement impact avoidance and minimization measures for construction activities in giant garter snake habitat and provide habitat compensation for temporary and permanent impacts to giant garter snake at a 3:1 mitigation ratio and a one-time endowment fee of $27,161.06 as required by the SJMSCP.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Within 15 days of site or related facilities mobilization, the project owner shall submit written verification to the CPM and the HTAC that the transaction for habitat compensation has occurred. A discussion of implementation of giant garter snake mitigation and avoidance measures shall be provided to the CPM in monthly compliance reports as necessary.

BURROWING OWL MITIGATION

BIO-10 The project owner shall implement all mitigation and impact avoidance measures outlined in CDFG's (1995) *Staff Report on Burrowing Owl Mitigation*. Pre-construction surveys for burrowing owls shall be conducted no more than 14 days prior to site mobilization. In the event that owls or owl sign are identified in the survey, the project owner shall do the following:

1. Location(s) of owls and owl sign will be mapped and noted. In the event an active burrow would be affected by the project, replacement burrows will be constructed at a location approved by the HTAC and passive relocation of the owls will occur prior to the start of construction. Passive relocation would only occur during the non-breeding season (September 1 through January 31) ; and

2. During breeding season (February 1 through August 31) occupied burrows shall not be disturbed and shall be provided with a 250-foot protective buffer until and unless the HTAC, with the concurrence of the permitting agencies or unless the designated biologist approved by the permitting agencies verifies through non-invasive means that either:

   A. The birds have not begun egg laying; or

   B. Juveniles from the occupied burrows are foraging independently and are capable of independent survival. Once the fledglings are capable of independent survival, the burrow can be destroyed.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Within 15 days of site or related facilities mobilization the project owner shall submit a report on the results of burrowing owl surveys to the CPM.

A discussion of implementation of burrowing owl mitigation and impact avoidance measures shall be submitted to the CPM in the monthly compliance reports as necessary.

SWAINSON'S HAWK MITIGATION

BIO-11 The project owner shall survey for nesting Swainson's hawk as part of the applicant's proposed pre-construction surveys within one mile of construction activities between March 20 and April 20. If active nests are found, mitigation measures consistent with the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFG 1994) shall be implemented as approved by the SJCOG HTAC. In addition, the project owner shall provide habitat compensation for temporary and permanent impacts at a 1:1 mitigation ratio and a one-time endowment fee of $16,342.68 as required by SJMSCP.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Pre-construction Swainson's hawk survey results shall be provided to the CPM within 15 days of completion of surveys. Within 15 days of site or related facilities mobilization, the project owner shall submit written verification to the CPM and the HTAC that the transaction for habitat compensation has occurred. A discussion of the implementation of Swainson's hawk mitigation and impact avoidance measures shall be submitted to the CPM in monthly compliance reports as necessary.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE FOR MIGRATORY BIRDS

BIO-12 The project owner shall implement the following measures to avoid or minimize impacts to nesting birds:

1. Pre-construction nest surveys within 500 feet of boundaries of the power plant site and linear facilities if construction activities will occur from February 1 through August 1;

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 14-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, schedule work outside nesting and fledging periods. If this is not possible, a no-disturbance buffer zone (protected areas surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with the HTAC and monitoring plan shall be developed. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results to the CPM; and

4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist, disturbed nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. At least 10 days prior to the start of any project-related ground disturbance activities, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest. A discussion of implementation of migratory bird mitigation and impact avoidance measures shall be submitted to the CPM in monthly compliance reports as necessary.

NORTHWESTERN AND WESTERN POND TURTLE MITIGATION

BIO-13 The project owner shall implement the following measures to avoid or minimize impacts to northwestern and western pond turtles:

1. Concurrent with pre-construction surveys for the giant garter snake, surveys will also be conducted for turtles and potential nest locations;

2. Temporary fencing will be installed along the edge of the irrigation canal and signs shall be posted identifying the area as environmentally sensitive; and

3. In the event a turtle or nest is identified in the work area, the location will be noted and the CDFG will immediately be contacted to determine the appropriate mitigation and impact avoidance measure to be taken prior to the start of any ground disturbance within 300 feet of the nest.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Within 15 days of site or related facilities mobilization the project owner shall submit a report on the results of pond turtle surveys to the CPM. A discussion of implementation of northwestern and western turtle mitigation and impact avoidance measures shall be submitted to the CPM in monthly compliance reports as necessary.

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CULTURAL RESOURCES

Testimony of Beverly E. Bastian

SUMMARY OF CONCLUSIONS

Staff identified no known cultural resources that the construction of the proposed Lodi Energy Center (LEC) project would significantly impact. Staff cannot, however, conclude that the LEC project would have no significant impact on potentially California Register of Historical Resources (CRHR)-eligible archaeological resources present on the site, buried deeper than three feet below the surface and at this time unidentified. To conclude its analysis of the LEC project's potential impacts on such buried resources, staff needs the following additional information from Northern California Power Authority (NCPA, the applicant):

- A detailed description of the extent horizontally and vertically of over-excavation and filling that would be done to raise the entire LEC site above the 100-year flood zone, because the over-excavation could impact unidentified buried archaeological resources and staff needs to know how extensive this impact would be; and
- A detailed description of the extent horizontally and vertically of soil remediation that would be required, because this activity
    - Could impact unidentified buried archaeological resources,
    - Would modify the parameters of the field study that staff proposes in **CUL-1**, and
    - Could present an opportunity for a pre-certification coordinated geoarchaeological field study, perhaps eliminating the need for the post-certification geoarchaeological field study staff is proposing in **CUL-1**.

Staff assumes that NCPA would be able to provide the former information for incorporation into staff's discussion of potential project impacts in the SA and for use as one factor in staff's specifying the extent of archaeological monitoring required in **CUL-9**.

Staff's proposed **CUL-1** requires that a geoarchaeologist conduct a study of the project site and write a report for submittal to the project owner, to the project Cultural Resources Specialist (CRS), and to the Energy Commission's Compliance Project Manager (CPM). **CUL-2** requires the CRS to be available during the geoarchaeological field work and during the LEC's construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. Under **CUL-3**, the CRS would evaluate the eligibility for the (CRHR) of any buried archaeological deposits encountered during geoarchaeological field work. Under **CUL-4**, the CRS would conduct data recovery from any buried archaeological deposits encountered during the geoarchaeological field work that the CRS recommended to be eligible for the CRHR.

Staff's proposed **CUL-5** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-6** requires that the CRS write, and submit for CPM approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), including the results of the geoarchaeological study, the evaluations of any

buried archaeological deposits encountered during the geoarchaeological field work, and data recovery plans for any evaluated archaeological deposits determined CRHR-eligible by the CPM. **CUL-7** requires the CRS to write and submit to the CPM a final report on all LEC cultural resources monitoring and mitigation activities. **CUL-8** requires the project owner to train workers to recognize cultural resources.

CUL-9 uses the recommendations, as approved by the CPM, of the geoarchaeological study and the results of any data recovery from CRHR-eligible archaeological deposits encountered during geoarchaeological field work, to configure the archaeological monitoring intended to identify buried prehistoric archaeological deposits, prescribing how much monitoring at what locations and depths in the project areas would be most consistent with CEQA requirements for mitigation of impacts through avoidance, when possible, and with the preservation goal of recovering valid scientific data from CRHR-eligible archaeological deposits whose destruction cannot be avoided. A Native American monitor will be included to observe ground disturbance, comment on any discoveries, and represent Native American heritage concerns.

Finally, **CUL-10** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible.

INTRODUCTION

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

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

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

Historic-period resources, both archaeological and architectural, are associated with the Euro-American exploration and settlement of California and the beginning of a written historical record for the state. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state historic preservation law, historic-period cultural resources must be at least 50 years old to have the potential to be of sufficient historical importance to merit. A resource less than 50 years of age must be of exceptional historical importance to be considered.

Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state laws, historic cultural resources must be greater than 50 years old to be considered of potential historic importance. A resource less than fifty years of age may be historically important if the resource is of exceptional importance in history.

For the LEC project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts to cultural resources from the proposed project using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR and whether the LEC would have a significant impact on those that are CRHR eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential impacts to those resources are identified and assessed, and that conditions of certification are proposed to ensure that all significant impacts that cannot be avoided are mitigated to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. For this project, in which there is no federal involvement,[1] the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

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

Cultural Resources Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State	
Public Resources Code 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
California Health and Safety Code, Section 7050.5	Makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
San Joaquin County General Plan (San Joaquin County 1992)	Heritage Resources, Objective 1: To protect San Joaquin County's valuable architectural, historical, archaeological and cultural resources; Policies: • The County will encourage efforts, both public and private, to preserve its historical and cultural heritage. • The County will identify and protect from destruction significant archaeological and historical resources. • The County will not knowingly destroy any significant cultural resources. • The County will support historic preservation.
City of Lodi General Plan (City of Lodi 1991)	Urban Design and Cultural Resources Element, Goal J: To preserve and enhance Lodi's historical heritage; Policies: The City will develop a historic preservation ordinance in coordination with the State Historic Preservation Office. The City will work with property owners to list historic structures as State Landmarks or on the National Register of Historic Places. The City will consult with the California Archeological Inventory, Central California Information Center, at Stanislaus State University, on any project that could have an impact on cultural resources and implement the center's recommended mitigation measures.

SETTING

Information provided regarding the setting of the proposed project places it in its geographical and geological context and specifies the technical description of the

project. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the CRHR eligibility of any identified cultural resources within staff's area of analysis for this project.

REGIONAL SETTING

The proposed LEC project site is located at the northern end of the San Joaquin Valley in the Delta Basins subsection of the Great Valley. The Sacramento-San Joaquin Delta is a complex of river deltas and estuaries covering approximately 738,000 acres that formed at the confluence of the Sacramento and San Joaquin Rivers. This region includes basins and floodplains on late Quaternary alluvium derived predominantly from granitic rock sources associated with the Mokelumne, Calaveras, and Cosumnes rivers. Topography throughout the region is nearly level with elevations ranging from 0 to 50 feet above mean sea level. The regional climate is characterized by cool, wet winters and hot, dry summers.

Historically, the Delta was a large tidally influenced marshland intermixed with riparian habitats along natural levees. Long-term reclamation efforts have resulted in the conversion of the majority of Delta land to agriculture. Today, the predominant land use throughout this area is agricultural with urban areas concentrated around the communities of Lodi and Stockton (NCPA 2008a, p. 5.2-1).

PROJECT, SITE, AND VICINITY DESCRIPTION

The LEC project is proposed by the NCPA, a 17-member, not-for-profit, joint power agency, of which the City of Lodi's Lodi Electric Utility is a member (NCPA 2008a, p. 1-2; NCPA Online). The proposed 4.4-acre LEC site is located on land owned and incorporated by the City of Lodi, six miles west of the Lodi city center in San Joaquin County. It is situated on the west side of Interstate 5 (I-5) approximately 1.7 miles south of State Route 12 (SR12). The average site elevation is five feet above mean sea level (NCPA 2009k, p. 4). Lands in the vicinity of the proposed project site have been developed primarily for agricultural uses, along with rural residences, roadways, and irrigation canals. Lodi's White Slough Water Pollution Control Facility (WPCF) lies on the east side of the proposed site, with its holding ponds occupying the north side. The existing NCPA 49-megawatt (MW) combustion Turbine Project #2 (STIG power plant) is adjacent to the west side of the LEC project, with a 230-kV Pacific Gas and Electric Company (PG&E) overhead electrical transmission line running further to the west. , The ponds of the San Joaquin County Mosquito and Vector Control District facility are located south of the proposed LEC plant site. Most of the proposed LEC site consists of level, undeveloped land that NCPA identifies as previously disturbed (NCPA 2008a, p. 6-1). Some of the STIG plant's infrastructure would be shared with the proposed new power plant, including an administration building and warehouse facilities (NCPA 2008a, p. 2-1).

The proposed LEC would be a combined-cycle, nominal 296-MW power generation facility consisting of a natural-gas–fired turbine-generator, a condensing steam turbine, a 7-cell cooling tower, and auxiliary equipment (CH2MHill2009c, p. 3; Table 2-1). The LEC's output would go to the existing STIG plant's 230-kV switchyard via an on-site, overhead, 230-kV transmission line running along the eastern and northern boundaries of the proposed plant site (NCPA 2008f, fig. DR9-1; CH2MHill2009c, fig. 2.1-1R). The

new transmission line would entail two dead-end structures and no more than eight support structures (Grenier 2009), which would probably have a monopole design with a caisson-type foundation (NCPA 2008a, p. 3-1, fig. 3.2-2; Grenier 2009). The LEC would acquire reclaimed water for all plant uses (except where potable water is required) from the WPCF, via a pipeline (to be upgraded in size), running in an existing utility corridor between the WPCF and the STIG plant (NCPA 2008a, p. 2-21; NCPA 2008f, p. 33). Off-site, the LEC would require construction of a new, approximately 14,122-foot-long, 12-inch-diameter natural gas pipeline, which would connect to the PG&E high-pressure line (#108) in a utility easement approximately 2.5 miles east of the proposed project site at the northwest corner of the intersection of West Armstrong Road and the Union Pacific Railroad (NCPA 2008a, p. 6-1). The proposed gas pipeline would mostly run parallel to the existing 3-mile-long natural gas pipeline that serves the STIG plant (NCPA 2009j, p. 2). Of the approximately 2.7 miles of gas pipeline, about 1.1 miles would be routed on unnamed dirt roads that separate agricultural fields (NCPA 2009j, p. 5). The pipeline would be installed in an open trench in existing utility easements and along agricultural fields, except where boring or directional drilling is required to pass beneath I-5 or buried utilities (NCPA 2009m, p. 2, fig. SR-1; NCPA 2008a, p. 4-1). Construction laydown and parking areas would be within the WPCF's parcel, on four undeveloped areas totaling 9.8 acres, adjacent to the proposed project site to the east and northeast. The power plant site is currently used for equipment storage for the WPCF (NCPA 2008a, p. 2-1).

Environmental Setting

The proposed project plant site is a 4.4-acre parcel on the eastern margin of the Sacramento-San Joaquin River Delta (Delta) near the toe of the Mokelumne River alluvial fan system (NCPA 2009k, Att. DR13-1, p. 2). The character of the Delta margin has undergone significant change through time that has led to dramatic shifts in the mosaic of natural resources available on it and adjacent landforms. The dynamics of the past human use of the proposed plant site partly reflects the ongoing process of local adaptation to the evolving natural resource base. To more reliably assess the likelihood that archaeological deposits representing such use may be present on the plant site, it is important to consider the historic character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the Delta margin and its ecology.

Paleoclimate

The San Francisco Bay-Delta system has undergone a series of significant environmental changes since the time that people are thought to have first entered and inhabited California, around 12,000 years ago. The climate of the geologic epoch known as the Pleistocene, characterized by continental glaciations, was cool and relatively wet, but during the late part of the Pleistocene, the climate warmed and the continental ice sheets began to retreat. Glacial melting raised sea level rapidly, which caused the Pacific shoreline to migrate eastward. By about 10,000 years ago, the rising sea passed through the Golden Gate and began to flood the inland area that would become San Francisco Bay and the Delta. The flooding continued until about 6,000 years ago, resulting in vast tidal marshes along the edges of the Delta estuary. The Holocene, the geologic epoch that followed the Pleistocene, and which continues to the present time, brought a climate marked by warmer temperatures and reduced moisture. This warmth

and aridity peaked about 5,000–7,000 years ago and was followed by a cooling trend, with variable moisture conditions. California's climate over the last 2,000 years has been marked by long periods of drought punctuated with brief and extremely wet climatic events. After 1850 AD, stable climatic conditions have generally prevailed in the Delta (Atwater, Hedel, and Helley 1977; Malamud-Roam et al. 2005; as cited in NCPA 2009k, Att. DR13-1).

Geology

The proposed project area lies in the northern and lowest portion of the San Joaquin Valley, part of the Great Valley geomorphic province (NCPA 2008a, p. 5.8-1), on the eastern margin of the Delta on near-surface alluvial sediments of the Sacramento, Mokelumne, and San Joaquin river systems (NCPA 2008a, p. 5.4-1). The Coast Ranges and the Sierra Nevada bound the principal basins of the Great Valley, the Sacramento basin to the north and the San Joaquin basin to the south. The Great Valley is a deep, sediment-filled structural trough approximately 435 miles from north to south and 44 to 56 miles from east to west that runs from near the City of Redding in Shasta County to south of the City of Bakersfield in Kern County. The shape of the steep underground contact between the basement rock sequences of the Sierra Nevada Mountains and the Coast Ranges, which bound the Central Valley to the east and west, respectively, define the structure and the form of the valley's base. The valley has been subject to the almost continuous deposition of sediments, in both marine and nonmarine environments, since the late Jurassic period (206 to 144 million years ago). The present surface of the valley floor is primarily unconsolidated alluvial sediments of Pleistocene and Holocene age (1.6 million year ago to present) (Norris and Webb 1976, pp. 289-305; NCPA 2008a, p. 5.8-1).

Geomorphology

The development of the Delta margin that is presently the geomorphic context for the proposed project area represents a long interplay of fluctuations in sea level resulting from global cycles of glaciation and fluctuations in the volume of glacial outwash sediments that streams arising in the Sierra Nevada Mountains have transported to the San Joaquin Valley floor. Drops in sea level related to Middle and Late Quaternary glacial cycles resulted in local river systems cutting down through valley sedimentary deposits as the delta system slowly moved to the west through the San Francisco Bay basin. Sea levels rose in warmer periods between glacial cycles causing the movement of the delta system to the east and the deposition of new sedimentary deposits in the area of the present Delta. The most recent episode of deglaciation and sea level rise, which led to the development of the Delta today and the deposition of the Mokelumne River alluvial fan system, began approximately 15,000 years ago. The present Delta was largely in place by approximately 6,000 years ago. Prior to the mid-1800s and the rapid Euroamerican transformation of the Delta due to the pursuit of agriculture, mining, and water control, the Delta had all of the classical features of a delta system such as interconnecting channels, low levees, broad flood basins, and abandoned and submerged channel segments (NCPA 2009k, Att. DR13-1, p. 2).

Pedology

Soil development on the Delta margin in the vicinity of the proposed project area appears to be relatively uniform. Soils of the project area are Devries sandy loam, which

are characteristic of historic flood basins and basin rims (NCPA 2009k, Att. DR13-1, p. 1). The Devries soil type is made up of somewhat poorly drained sandy loams derived from mixed rock sources and deposited as alluvium. These soils typically have an indurated hardpan at a depth of 20–40 inches beneath the present ground surface (NCPA 2008a, pp. 5.11-2, 5.11-6).

Paleoecology

The ecology of the proposed project area has been dynamic through time. Late Pleistocene vegetation associations in the San Joaquin Valley appear to have resembled those in the present Great Basin. Fossil pollen evidence suggests an association of juniper, sagebrush, and greasewood (*Sarcobatus vermiculatus*) on the valley floor and a woodland association of piñon pine and juniper with a sagebrush understory across the foothills of the Sierra Nevada on the eastern side of the valley (Rosenthal and Meyer 2004, p. 8).

The late Pleistocene vegetation association on the valley floor appears to have been relatively stable through the early Holocene from approximately 11,800 to 9,500 years ago. An association of oak, mountain mahogany (*Cercocarpus* spp.), and bitterbrush (*Purshia* spp.) largely displaces the earlier valley floor association by approximately 9,500 years ago, although greasewood remains an element of the association through approximately 7,800 years ago (Rosenthal and Meyer 2004, p. 16).

The Sacramento-San Joaquin River Delta began to develop in the middle Holocene. The salt water of San Francisco Bay reached Browns Island at the present mouth of the Delta by approximately 6,200 years ago. After approximately 5,500 years ago, the Delta landform and its associated brackish and freshwater marshes matured and slowly spread east and south during the late Holocene, reaching its maximum extent maybe as recently as the last 1,000 years (Rosenthal and Meyer 2004, p. 19, 20).

Prehistoric Background of the Central Valley

Over the years of archaeological investigation of California's prehistory, several chronological sequences have been devised to trace the development of Central Valley Native American cultures and economies over time. These sequences are based on the persistence or replacement of such material characteristics as burial customs and artifact types. Four such schemes have been employed by Central Valley archaeologists in the twentieth and twenty-first centuries. The earliest classificatory scheme reached its most evolved expression in 1939, positing for the Central Valley an Early Period, a Transitional Period, and a Late Period, each succeeding the last, but without absolute dates ascribed (Lillard et al. 1939; Moratto 1984, pp. 179–180). The Lillard Delta scheme was the basis for the next scheme, the Central California Taxonomic System (CCTS), which extended the Lillard scheme to include the Bay Area and renamed the three periods as Early Horizon, Middle Horizon, and Late Horizon . From the 1950s through the early 1970s, California archaeologists made refinements to the trait lists by which these periods were defined (Beardsley 1954; Moratto 1984, pp. 181–183) and, through the use of radiocarbon dating, began to ascribe absolute date ranges to them, which made it possible to set the beginning of the Central Valley chronological schemes at around 2000 BC. With the dimension of time added, conceptual problems with the CCTS began to emerge, as it became clear that it did not

accommodate differential rates of change in different areas, tended to obscure gradual change, and focused analysis on traits rather than on culture (Moratto 1984, pp. 183–185, 199–201).

Subsequent archaeological chronologies were more modest in scope and localized, but in 1973, in a third regional scheme, Fredrickson advanced the idea of cultural units, called patterns, that lacked temporal significance but implied a common set of lifeways in a particular geographic area. For the Central Valley, he defined three patterns, Windmiller, Berkeley, and Augustine (Fredrickson 1973; Moratto 1984, p. 201), and, along with other archaeologists, over the next decade interpreted characteristic subsistence activities, trading preferences, and social organization for them (Moratto 1984, pp. 201–214), as well as their geographic occurrence.

Because they were based on the archaeological evidence actually found and studied, these earlier schemes largely ignored the period of human use of the Central Valley that preceded 2000 BC. California archaeologists assumed that people were living in the valley before that, but had found very little evidence of it. In contrast, the fourth chronological scheme, that of Rosenthal et al. in a recent article on the archaeology of the Central Valley, includes the pre-2000 BC period. In addition, it uses calibrated radiocarbon dates to create its period divisions and claims a wider geographic applicability than the earlier schemes. It recognizes five periods: Paleo-Indian, Lower Archaic, Middle Archaic, Upper Archaic, and Emergent (Rosenthal et al. 2007, p. 150).

Paleo-Indian (11,550–to 8550 BC) and Lower Archaic (8550–5550 BC)

The earliest generally accepted evidence for the human occupation of the North American continent, dating from about 10,000 years BC, is the occurrence of large, very skillfully made stone spear points, sometimes in association with the remains of now-extinct giant mammals (megafauna). This occupation is known archaeologically as the Big Game Hunting Tradition, or the Fluted Point Tradition. The Big Game Hunting Tradition, evidenced all over the American continent but centered in the Great Plains and Southwest, apparently had a nearly exclusive focus on the exploitation of large game animals. Archaeologists believe that the Big Game Hunting Tradition did not occur in California, although its characteristic fluted projectile points have been found all over the state. Rather, when the glaciers of the Pleistocene era retreated and the warmer and drier climate of the Holocene caused the sea level to rise along the coast, the formerly plentiful inland lakes to shrink or dry up, and the extinction of megafauna (Moratto 1984: 78-81), California's late Pleistocene and early Holocene peoples were forced to adopt a general hunter-forager subsistence mode and to live near reliable water sources where food was consistently available. After 5000 BC, the warmer, drier climate gave way to a cooler, moister regime, and Native Americans refined their exploitative abilities by developing their technology and adapting their lifestyles to the seasonal availability of a wide variety of local food sources.

In the Central Valley, Rosenthal's Paleo-Indian and Lower Archaic periods are represented primarily by isolated finds on the few Pleistocene and early Holocene landforms that have not been buried by alluvium from episodes of sediment deposition (Rosenthal et al. 2007, p. 151).

Middle Archaic (5550–550 BC)

Rosenthal's Middle Archaic period began with a climatic shift to a warmer and drier climate that coincided with the formation of the Delta. According to Rosenthal et al., the earliest part of this period is poorly represented archaeologically for the same reasons as the Paleo-Indian and Early Archaic periods, but numbers of sites are known for the post-2550 BC portion, and their excavation has produced extensive evidence on subsistence and technology. The latter half of the Middle Archaic period corresponds to Fredrickson's Windmiller pattern in the upper San Joaquin Valley, dating between 1850 and 750 BC (Rosenthal et al. 2007, pp. 153–154).

Windmiller sites are well represented in the Delta region (Wohlgemuth and Mears 1994, p. 6-7; Rosenthal et al., 2007, p. 153), and 6 of the 12 known Windmiller sites are in the Stockton area (Napton 2006, pp. 6–7; Wohlgemuth and Mears 1994). Windmiller sites indicate that subsistence was based on a variety of food resources that included many kinds of fish, birds, and mammals. Seeds, roots, and acorns appear to have been important dietary elements as well, despite the paucity of milling equipment associated with Windmiller sites (Rosenthal, et al., 2007, p. 155). These dietary remains also indicate a more sedentary, year-round settlement pattern. Windmiller groups in the Delta had extensive trade networks which focused on acquiring both utility goods, such as obsidian for toolstone, and ornamental and ceremonial objects, such as abalone shell, olivella shell beads, and quartz crystals (Moratto 1984; Wohlgemuth and Mears 1994; Rosenthal, et al., 2007). Their mortuary complex is characterized by fully extended burials, placed face down, with the head in a westerly orientation. Grave goods were common. The funerary use of red ochre has also been frequently documented (Fredrickson 1973; Moratto 1984; Rosenthal, et al., 2007).

Upper Archaic (550 BC–AD 1100)

Rosenthal's Upper Archaic saw a change to a cooler, wetter, and more stable climate associated with further sediment deposition in the Central Valley, producing the material for the formation of the current surface soils there. The Upper Archaic is better represented than previous periods. Archaeological sites of the Upper Archaic are those that were termed Middle Horizon and Berkeley pattern in earlier chronological schemes, but more recent dating evidence indicates that the Windmiller pattern was not replaced by the Berkeley pattern but rather the two coexisted in different parts of the San Joaquin Valley throughout the Upper Archaic period (Rosenthal et al. 2007, pp. 155–156).

In contrast to Windmiller pattern sites, the abundant remains of milling equipment, particularly mortars and pestles, found at Berkeley pattern sites indicates a reliance on plant resources, especially acorns, as dietary staples (Moratto 1984, pp. 209–210; Wohlgemuth and Mears 1994, p. 7; Rosenthal, et al., 2007, p. 156). Other technological differences include a highly developed worked-bone industry, distinctive diagonal flaking patterns on large concave-base projectile points, and split-punched and saddle-shaped Olivella shell beads (Moratto 1984, p. 210). The contrasts continue into mortuary patterns, where the dead are generally interred in a flexed position with variable orientation and fewer grave goods. Berkeley pattern sites are the remains of large mounded villages with extensive accumulations of habitation debris and hearths. This

information, combined with the evident technological complexity, indicates that Berkeley pattern peoples were living in the same areas, not only year-round, but for long periods of time (Rosenthal 2007, p. 156).

Emergent (1100 AD–Historic Period)

The climate of Rosenthal's Emergent period was stable and similar to that of the present. This period equates to the CCTS's Late Horizon and Fredrickson's Augustine pattern. Of all the defined periods for the Delta, it is the best represented archaeologically. In this period, earlier technologies disappeared and those that are known from the time of European contact begin to appear, including the use of the bow and arrow (Rosenthal et al. 2007, pp. 157–159).

This pattern is characterized by settlements indicative of large, dense populations with elaborate trade networks and an intensive hunting, fishing, and gathering subsistence strategy with a continued focus on acorns (Moratto 1984, p. 213; Wohlgemuth and Mears 1994, p. 7). Technologically, the Augustine Pattern is distinguished by the bow and arrow, serrated arrow points, bone awls used in coiled basket making, shaped mortars and pestles, the introduction of clam shell disk beads, drilled Olivella sequin beads, incised bone tubes and abalone ornaments, large amounts of baked clay "globs" (substitutes for rocks used to cook acorn mush in baskets), and emergent pottery (Moratto 1984, p. 211, 213; Rosenthal, et al., 2007, pp. 157–158). Mortuary practices involved either cremation or pre-interment burning of the grave-pit and artifacts, coupled with flexed burials. Differential distribution of grave goods, evidence of increased trade, and settlement expansions indicate that the Augustine Pattern was a period of population growth and escalating sociopolitical complexity.

Ethnographic Background

The project area is located within the vast traditional territory claimed by the California Native American group known as the Yokuts. Yokuts is a term applied to a large and diverse group who formerly inhabited the San Joaquin Valley and Sierra Nevada foothills of central California. Anthropologists have divided the Yokuts into three groups based on geographical location. The Northern Valley Yokuts are identified with a 40-to 60-mile-wide area straddling the San Joaquin River, south of the Mokelumne River, east of the Diablo Range, and north of the sharp bend that the San Joaquin River takes to the northeast (Wallace 1978, p. 462). The Foothill Yokuts are associated with the western slopes of the Sierra Nevada from the Fresno River southward to the Kern River (Wallace 1978, p. 471). The Southern Valley Yokuts claimed the area around Tulare, Buena Vista, and Kern lakes, between their connecting sloughs, and around the lower portions of the Kings, Kaweah, Tule, and Kern rivers (Wallace 1978, p. 448). The LEC project is located in the traditional territory claimed by the Northern Valley Yokuts.

Before the northern San Joaquin Valley was transformed for agriculture in the nineteenth century, sloughs and marshes dominated the floodplain of the San Joaquin River. This environment provided an abundant supply of animal and plant foods and materials (Wallace 1978, pp. 462–463). Tules, which could grow as tall as 10 to12 feet, dominated the region, with sage, greasewood, and bunchgrasses found in the drier areas. The Northern Valley Yokuts used bunched tule reeds to construct light watercraft

that made water travel very efficient, and trade relations were maintained with others peoples through a system of waterways and overland trails (Wallace 1978, pp. 464–466).

The Northern Valley Yokuts relied heavily on their riverine environment as a source for settlement and subsistence. Settlement locations were apparently chosen in response to subsistence resources and protection from winter and spring flooding. Groups were organized in territorial tribelets of up to 300 people, living in permanent villages on mounds along the river, although gathering parties left the villages seasonally to collect food and materials. Secondary settlements consisted of small camps or villages of several households. A Northern Valley Yokuts settlement was characterized by domed-shaped houses and shelters made of brush and tules (Wallace 1978, p. 466).

Fish, mussels, pond turtles, waterfowl, tule elk, pronghorn antelope, jackrabbits, squirrels, and quail were all found in abundance in and near the water. Salmon, in particular, is noted as a prime source of food in historical accounts of the Northern Valley Yokuts. Secondary to fishing, fowling provided the most important source of meat, as geese, ducks, and other aquatic birds were abundant in the wetlands. Harvesting of wild plants was very important to tribal subsistence. Oak trees that grew on the valley floor supplied the acorns that became a dietary staple for the Northern Valley Yokuts (Wallace 1978, pp. 463–464).

The destruction of native Delta cultures was the result of several factors, the first of which was the establishment of Spanish missions in northern California. Even before explorers and settlers made extensive contact, the missions of San Jose, Santa Clara, and others were drawing Indians away from their native villages. Secularization of the missions in 1833 forced many missionized Indians of various coastal and valley cultural affiliations to seek refuge from encroaching settlers with remote Native American groups still unaffected by Mexican influence, which further separated the refugees from their cultural roots. The introduction of European diseases had a decimating effect on native populations throughout California. A deadly malaria epidemic killed thousands of Yokuts people in1833.[2] The final collapse of independent Delta cultures occurred when waves of American settlers after the Gold Rush appropriated native territory for agriculture. Village mounds of the native peoples that had been abandoned were re-occupied by farmhouses, buried under artificial levees, or leveled for agriculture (Wallace 1978, p. 462; Bennyhoff 1977, p. 248).

Historic Background

Historians of California recognize three periods: the eighteenth- and nineteenth-century Spanish exploration and settlement of California, the brief tenure of Mexico, and the subsequent American acquisition and annexation.

[2] The disease was introduced by a Hudson's Bay fur-trading party from Oregon and became endemic to the Delta region due to the prior presence of an effective vector, the Anopheles mosquito. From that time until the early twentieth century, malaria was a hazard to all who lived in or traveled through the Delta (Owens 1991, p. 15).

Spanish Period (1769–1821)

The Spanish period in California spans the years from 1769 to 1822 beginning with the founding of the first mission, the Mission San Diego de Alcala in 1769. In March of 1772, Pedro Fages and his company became the first Europeans to enter the northern San Joaquin Valley by reaching the mouth of the San Joaquin River and tracing the river upstream (Smith 2004, p. 149). Shortly thereafter, Father Francisco Garcés visited the valley and recorded the presence of native villages, wide rivers, large tule swamps, and huge herds of tule elk (NCPA 2008a, p. 5.3-5). No permanent Spanish settlements, however, were ever established in the vicinity of the proposed LEC project.

Mexican Period (1821–1848)

In 1821, Mexico gained its independence from Spain, and Alta California[3] became one of the provinces of the Republic of Mexico. After the government secularized the missions in 1833, the Mexican governors of Alta California began making large (commonly 48,000 acres) cattle-ranching grants of former mission lands to Mexican citizens, particularly to soldiers and members of prominent families who had financed various government initiatives. In the 1840s, the Mexican authorities made a few large rancho grants in the San Joaquin Valley, but very few actual homesteads were established. The closest rancho to the LEC project area is the Rancho de los Franceses, on part of which Stockton is now located. Governor Micheltoreno granted Rancho de los Franceses to William Gulnac, a native of New York, on June 13, 1844. The rancho encompassed 48,747.03 acres (NCPA 2008a, p. 5.3-5).

American Period (1848 to the present)

Following the conclusion of the Mexican War in 1848, the proposed LEC project vicinity came under the control of the United States. Late in that same year gold was discovered at Sutter's Mill in Coloma, triggering the Gold Rush of 1849, a consequent population explosion, and statehood in 1850. These events inaugurated an era of widespread settlement in California and the beginning of commerce in the LEC area, as Stockton became the main supply city for miners headed to the southern Sierra mines, which stretched from the Mokelumne River to the Kern River (NCPA 2008a, p. 5.3-6).

In the Delta area, land became available for agriculture by private purchase from the state, to whom the federal government had granted the land under the Swamp Land Act of 1850. Most California Delta land was transferred into private hands by 1870 (West and Welch 1996, pp. 2–3). For agriculture to become established and profitable, levee construction was necessary to prevent annual flooding of fields, and the first Delta levee was built in 1853 (Goetter 2008a, p. 14). Most early reclamation efforts were applied to islands and consisted of levees, which often failed.

Levee construction was labor-intensive, with many Chinese involved in the work before their immigration was banned in 1882. It entailed building miles of twin retaining walls, into and over which was piled material dredged from channels cut to facilitate transportation via watercraft and canals cut to provide water for the fields. Siphon

[3] Alta (Upper) California was the Mexican name for what is now known as the State of California and was distinct from Baja (Lower) California, which remained part of Mexico after Mexico ceded Alta California to the United States in the Treaty of Guadalupe Hidalgo in 1848.

pumps moved water from canals into the fields and de-watered fields if the levees broke and they flooded, which was a frequent occurrence in the nineteenth century. The obvious need for cooperation among landowners spurred the creation of local reclamation districts by county boards of supervisors in the 1870s.

Severe floods between 1878 and 1881, caused in part by the river-clogging upstream operations of hydraulic gold mining, overwhelmed the ability of local districts to prevent flooding, until a California Supreme Court ruling in 1884 ended the hydraulic mining industry's abuse of the rivers. The mechanization of dredging by steam power, introduced in 1879, greatly decreased the cost of moving levee fill and encouraged new reclamation efforts. By 1900, reclaimed acreage had more than doubled from what it had been in 1870, and by 1920, it had nearly doubled again.

After a major flood in 1907, better levee systems were developed, with subsequent elaboration, including rip-rap, dredging, channel cuts, canals, drainage ditches, and pumping stations. In the twentieth century, levee repair and improvement has been a continuous process. The Delta today consists of more than 500,000 acres of reclaimed farm land accessed by 1,000 miles of waterways (Owens 1991, pp. 20–21, 23–24; West and Welch 1996, pp. 10–11; Goetter 2008a, p. 14).

The first American settlement of the Lodi area was the establishment of a school in 1859 on a site near Cherokee Lane and Turner Road, in what would become the city of Lodi. By 1869, a 160-acre town-site had been platted, and four settlers offered the Central Pacific Railroad 12 acres there for a railroad station. Once the railroad accepted, surveyors laid out the streets (NCPA 2008a, p. 5.3-6). A store was soon set up, located at the corner of Pine and Sacramento Streets, drawing homesteaders and other businesses to the area. Wheat was the first major crop of the area, which the railroad transported to market and which the Lodi Flouring Mill, set up in 1876, processed. By 1880, San Joaquin County raised the largest single wheat crop in the world—some 3.4 million bushels—much of it grown around Lodi (City of Lodi 2006).

Grape-growing and wine-making soon came to dominate local agriculture (NCPA 2008a, p. 5.3-7). By 1899, over 2.3 million grapevines were growing in the area. In 1906, Lodi was incorporated, with a population of nearly 2,000 persons, and in 1907, the city's signature mission-style arch was built at Pine and Sacramento Streets, at a cost of $500 (It was later restored in 1956). In September, 1934, the city held the first Lodi Grape Festival. In 1956, the federal government officially recognized Lodi as a winegrape-growing district, allowing vintners to label their wine as coming from Lodi. In 1979 Robert Mondavi acquired the land for the Woodbridge Winery, which has become one of the largest table-wine labels in the nation. In 1986, the Lodi viticulture area received official recognition as an appellation, accelerating the push toward the quality table wine market among Lodi wine makers. In 2000, Lodi's population reached 56,999. In 2001, the Lodi Arch Bear was restored with a 23-karat, gold-leaf finish and rededicated (City of Lodi 2006). The city of Lodi now claims approximately 70,000 individuals and is considered a part of metropolitan Stockton (NCPA 2008a, p. 5.3-7).

Beside the sailing schooners and steamboats that provided transportation in the Delta itself, the Central Pacific Railroad was the most important land mode of transportation in the nineteenth century for the region in which the proposed LEC is located. In the early

twentieth century, another railroad came into the area. The Western Pacific Railway Company formed in 1903 to build a transcontinental route to compete with the Southern Pacific (SP). When completed in 1909, the Western Pacific Railroad (WPRR) ran from Oakland south to Niles Junction, east through the Livermore Valley and over Altamont Pass to Tracy, then north to Stockton, Sacramento, Marysville, and Oroville, then east up the Feather River Canyon through Beckwourth Pass, through Reno, and on to Salt Lake City. Though longer than the SP route, the WPRR route had more gradual grades and wider track curvatures that reduced operating costs. Nonetheless, the route ran mostly through sparsely populated areas and initially had few feeder lines, so it struggled financially with heavy construction costs and light revenue, which forced it into bankruptcy in 1916.

After reorganization, the Western Pacific Railway Corporation addressed its deficient customer base by acquiring feeder lines serving the large San Joaquin agricultural area that was experiencing a wartime boom. In the 1920s, the company's further acquisitions allowed it to expand into the growing interurban electric railway network in the valley. The Great Depression took its toll on the WPRR, and it went into bankruptcy again in 1936. World War II again brought the reorganized company into profitability, carrying troops, military equipment, and war-related industrial freight across the country. After the war, the company used its war profits to modernize, replacing steam with diesel locomotives. In the 1960s, other railroads were jockeying to take over the WPRR, and the company nearly merged with the Santa Fe Railroad in 1965, but the Interstate Commerce Commission blocked the merger. After more maneuvering to provide the best outcome for its stockholders, the WPRR's holding company sold the railroad to the Union Pacific Railroad (UPRR) in 1980. UPRR immediately embarked on an improvement program for the WPRR, including improving the roadbed to accommodate heavier traffic and new ties and heavier rails (JRP 1994, pp. 2–4).

CULTURAL RESOURCES INVENTORY

A project-specific cultural resources inventory is a necessary step in staff's effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore, under CEQA, have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources in the vicinity of the proposed project, assessing the results of any geotechnical studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance (see "Determining the Historical Significance of Cultural Resources," below) for any cultural resources that are identified.

This subsection describes the research methods used by the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), archival research, Native American consultation, and field investigations. Staff provides a description of each identified cultural resource, its

historical significance, and the basis for its significance evaluation. Assessments of the project's impacts on historically significant cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for all significant impacts are presented in a separate subsection below.

Project Area of Analysis

The inventorying of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step in the assessment of whether the proposed project may cause a significant impact to an important cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, called the "project area of analysis," can vary depending on the type of cultural resources under analysis and is usually defined as a specific area within and surrounding the project site and associated linear facility corridors. Staff identified no ethnographic resources, historic districts, or cultural landscapes in the vicinity of the proposed LEC and therefore defined no project areas of analysis for these kinds of cultural resources. Staff defined, however, a project area of analysis for the following two cultural resources types:

- For archaeological resources, the area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus 50 feet to either side of the routes. Staff has used these minimum specifications for its archaeological project area of analysis for the proposed LEC project, plus the maximum depth that would be reached by all foundation excavations and by all pipeline installation trenches.
- For built-environment resources, the project area of analysis is minimally defined as one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a 0.5-mile buffer from the project site, and from any above-ground linear facilities (to encompass resources whose setting could be adversely affected by industrial development). Staff has used these minimum specifications for its built-environment project area of analysis for the proposed LEC project.

As used by staff, the term, "project areas," means the footprints of the several project components, including the plant site, the laydown area(s), and the several linear facility corridors, plus any new access roads, and any borrow and disposal sites.

Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resources surveys. The Energy Commission's Data Regulations require applicants to acquire information specific to the vicinity of their project from certain repositories and to provide it to staff as part of the AFC. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to consult with knowledgeable individuals in local agencies and organizations and with Native Americans who have expressed an interest in being informed about development projects in areas to which they have traditional ties.

Summary of Results of Background Inventory Research

Background inventory review commissioned by NCPA's environmental consulting firm, CH2MHill, indicated that no archaeological sites or potentially CRHR-eligible built-environment resources have been recorded in the project area of analysis. Further CH2MHill archival research revealed that the existing structures on and around the project site were constructed less than 45 years ago and so could not be eligible for the CRHR. CH2MHill identified no additional recorded cultural resources from the files of local governments and local historical organizations. CH2MHill and staff independently initiated Native American consultation, but to date neither has received information that the LEC project raises concerns for Native Americans. With respect to assessing the likely presence of buried archaeological deposits on the proposed LEC site, staff requested and received from NCPA a geomorphological literature study that was inconclusive; acquired a regional geoarchaeological study applicable to the LEC site but of insufficient resolution to be more than suggestive; and requested from NCPA the completion of a subsurface geoarchaeological field study to provide more substantive evidence on the potential presence of buried archaeological deposits at the LEC site. NCPA objected to this request and refused to provide the requested information.

CHRIS Records and Reports Search

The California Historical Resources Information System, or CHRIS, is a federation of 11 independent cultural resources data repositories overseen by the California State Office of Historic Preservation. These centers are located around the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and in turn submit new data from their ongoing research to the centers.

CHRIS Results

CH2MHill commissioned a records and reports search of the project areas at the Central California Information Center (CCIC), which is the CHRIS-affiliated center for San Joaquin County, located at California State University at Stanislaus (Turlock). The CHRIS search covered the area within a 1.0-mile radius of the project areas (NCPA 2008a, p. 4-1; NCPA 2009j, p. 4) and for that search area identified all recorded archaeological sites and built-environment resources, as well as all filed cultural resources survey and excavation reports. CCIC staff searched the following sources:

- National Register of Historic Places (NHRP);
- California Register of Historical Resources (CRHR);
- California Historical Landmarks; and
- California Points of Historical Interest.

CCIC staff also provided CH2MHill with copies of portions of historic maps that show the project areas and surrounding vicinity. Included maps were:

- A General Land Office plat map (1853-1867);
- 1879 Thompson and West Map # 1 (Thompson and West 1879);
- 1910 "Castle" 7.5' U.S. Geological Survey (USGS) topographic map;

- 1939 “Lodi” 15’ U.S. Army Corps of Engineers (USACOE) map;
- 1952 “Terminous” 7.5’ USGS topographic map; and
- 1953 “Lodi South” 7.5’ USGS topographic map.

The CHRIS records search indicated that no cultural resources within a 1.0-mile radius of the proposed LEC had been previously recorded. The CHRIS files yielded reports from five previous cultural resources studies conducted within one mile of the LEC project areas (Goetter 2008a, Goetter 2008b, Owens 1991, PMC 2006, Wohlgemuth 1990), one of which covered part of the route of the off-site natural gas pipeline, and two of which covered the proposed LEC plant site. In 1990, Wohlgemuth surveyed the proposed LEC plant site and adjacent area as one of four locations for a new NCPA power plant, but identified no cultural resources (1990, p. 2). In 1996, Pacific Municipal Consultants surveyed the entire White Slough Water Pollution Control Facility parcel in connection with proposed improvements at that facility. This survey covered the proposed LEC plant site and the western end of the LEC natural gas pipeline. PMC reported negative results for cultural resources (PMC 2006, p. 4). From these sources, CH2MHill concluded that no recorded cultural resources were known for the proposed LEC project areas (NCPA 2008a, p. 5.3-8).

Archival Research

Detailed resource-specific information needed by staff may entail research in various archives, holding such sources as historic aerial photography, historic maps, city directories, and assessors’ records. The applicant may include archival information as part of the information provided to staff in the AFC or may undertake such research to respond to staff’s Data Requests. Staff may also undertake such research to supplement information provided by the applicant.

Archival Research Results

CH2MHill’s architectural historian undertook additional archival research to determine whether buildings and structures located on the LEC project site, or located within a 0.5-mile radius of the site, were potentially CRHR-eligible, that is, older than 45 years. The architectural historian conducted research at the San Joaquin County Assessor’s Office, the San Joaquin Community Development Department, the City of Lodi Building Department, and the San Joaquin County Mosquito and Vector Control District. The architectural historian’s archival research revealed that the existing structures at or within a radius of 0.5 mile of the LEC site were constructed less than 45 years ago, so no further survey or evaluation of the historical significance of these structures was required (NCPA 2008b, pp. 28–29).

At staff’s request, CH2MHill’s geoarchaeologist undertook an additional literature study to respond to a staff data request for historical geomorphological information (CEC 2009b, Data Request # 13) that specifically addressed the likelihood of buried prehistoric archaeological sites in the LEC project areas. Staff requested this information because:

- The CHRIS cultural resources reports search did not identify any subsurface archaeological studies that contained such information;

- CH2MHill's cultural resources field inventory investigations (see below) included no subsurface exploration, so neither the cultural resources section of the AFC nor the confidential technical cultural resources report included such information;
- Prior to the historic-period transformation of the area for agriculture, archaeologists noted that many of the prehistoric archaeological sites in the Delta were on low mounds, some of which extended below the current ground level or were buried entirely with no surface evidence, raising the question of the potential presence of buried archaeological deposits (West and Welch 1996, p. 5, citing Schenck and Dawson 1929, p. 330);
- Paleontological and soils data in the AFC indicated the presence of Mokelumne River alluvial fan deposits, and other alluvial deposits, in the vicinity of the proposed project areas, all of which could have buried prehistoric archaeological sites (NCPA 2008a, p. 5.8-4); and
- CH2MHill suggested that the archaeological sensitivity of the underlying soils at the proposed plant site is considered to be moderate to low, and the possibility exists that intact archaeological deposits could be present beneath the plow zone (NCPA 2008a, p. 5.3-14).

Staff found that CH2MHill's response, a technical memorandum by geomorphologist Dr. W. Geoffrey Spaulding, did not provide sufficiently specific information on the particular depositional history of the project area sediment sequence (NCPA 2009k, Att. DR13-1). In a March 11, 2009 conference call, including Energy Commission staff and NCPA representatives, Dr. Spaulding indicated that the geotechnical studies in the AFC do not provide the data needed to answer staff's specific questions about the history of the sediment sequence (the stratigraphy) of the project area, and that, due to the lack of natural or artificial exposures of stratigraphy in the project vicinity, surface observation also could not provide the necessary data. Staff and Dr. Spaulding concluded that excavation of a limited number of trenches at the plant site would yield the information staff requires to complete its analysis (CEC 2009e). Still seeking this needed information, staff submitted Data Request 13 Supplement, asking that NCPA conduct a geoarchaeological field study to clarify the particular history of the proposed LEC plant site sediments and to better assess the likelihood of buried archaeological deposits there (CEC 2009g).

Pursuing other avenues to acquire the needed information on the potential of the project areas to contain buried prehistoric archaeological deposits, staff obtained a copy of a geoarchaeological study of Caltrans District 10 (Rosenthal and Meyer 2004). This study examined the potential for buried resources along rural highways in, among others, San Joaquin County. It offered a detailed regional environmental context, along with discussions of the geological evolution of the central California landscape and the way in which these changes have affected the region's archaeological record. The study included a map that covered the LEC project areas, showing quaternary landforms and their sensitivity for buried archaeological deposits. Staff found this report, again, not of sufficiently fine resolution to provide the site-specific information on subsurface stratigraphy that staff sought through its original Data Request 13 and its subsequent Data Request 13 Supplement.

On April 15, 2009, NCPA filed an objection to staff's Data Request 13 Supplement, stating that the request was "unduly burdensome, unduly time-consuming," and would not lead to any relevant information. Staff had not seen the Caltrans District 10 study at the time it sent the Data Request 13 Supplement to NCPA, so staff thought that if Dr. Spaulding reviewed that study, he might be able to suggest an alternative approach to obtaining the information staff was requesting, an alternative that NCPA might find acceptable. So, on May 7, at staff's request, Dr. Spaulding visited the Energy Commission and reviewed the Caltrans District 10 study. On May 14, 2009, Energy Commission staff and NCPA representatives again participated in a conference call to discuss Dr. Spaulding's recommendations. Like staff, Dr. Spaulding found that the Caltrans District 10 study was not sufficiently site-specific to provide data that would answer staff's original Data Request 13. Dr. Spaulding also indicated that he did not think that the field study of the proposed LEC plant site requested in staff's Data Request 13 Supplement was warranted.

Staff then undertook to obtain LEC site-specific subsurface stratigraphic information from other possible sources. Staff contacted the City of Lodi, requesting a copy of the CEQA-required Environmental Impact Report (EIR) completed for the STIG plant, and also a copy of any archaeological construction monitoring report completed after the construction of the STIG plant. On May 20, 2009, George F. Morrow, Director of Lodi Electric Utility, e-mailed to staff the Environmental Setting portion of the STIG EIR, but staff found no site-specific information on stratigraphy in that report. On May 21, 2009, Mr. Morrow informed staff by e-mail that no report on archaeological monitoring at the STIG plant was found in the utility's files. Thus staff has not yet obtained the site-specific stratigraphic information needed to assess the potential of the LEC project to impact buried archaeological resources.

Local Agency and Organization Consultation

California counties and cities may recognize particular cultural resources as locally historically important by ordinance, in general plans, or by maintaining specific lists. The Energy Commission's Data Regulations require applicants to acquire information on locally recognized cultural resources specific to the vicinity of their project by consulting local planning agencies and local historical and archaeological societies.

To determine whether any local agencies and organizations recognize any additional cultural resources on or near the LEC project site, on June 30, 2008, CH2MHill contacted history organizations in the Lodi area, including the Lodi Historical Society and the San Joaquin Historical Society and Museum. To date, CH2MHill has received no responses regarding historic structures from either organization. CH2MHill also contacted the Planning Department of San Joaquin County on August 21, 2008. San Joaquin County does not maintain a list of historic properties and was unable to provide additional information regarding historic properties near the project area (NCPA 2008a, Appendix 5.3).

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans (referred to by staff as Native American ethnographic resources). The

NAHC's "Sacred Lands" database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC "Contacts" database has the names and contact information for Native American individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas. Both applicants and staff request information on the presence of sacred lands in the vicinity of a proposed project and also request a list of Native Americans to whom inquiries will be made to identify both additional cultural resources and any concerns the Native Americans may have about a proposed project.

To determine whether Native Americans recognize any additional cultural resources on or near the LEC project site, or have any concerns about proposed project activities, CH2MHill contacted the NAHC by letter on June 30, 2008, requesting contact information for Native Americans having heritage ties to San Joaquin County and information about places of concern to Native Americans that may lie in the project vicinity. The NAHC informed CH2MHill that their record search of the "Sacred Lands" database did not indicate the presence of Native American cultural resources in the immediate LEC vicinity. The NAHC also provided to CH2MHill a list of Native Americans interested in being informed about development in San Joaquin County. CH2MHill sent a letter to each of these individuals/groups on July 11, 2008. When possible, CH2MHill emailed and faxed the letters on July 14, 2008, as well. To date, CH2MHill has received no responses (NCPA 2008a, p. 5.3-13).

Staff also contacted the NAHC by letter on October 31, 2008, to request information about sacred lands in the project vicinity and to obtain contact information for Native Americans having heritage ties to San Joaquin County. The NAHC responded to staff by letter on February 26, 2009, with a negative report on the presence of Native American cultural resources in the project vicinity. The NAHC also provided a list of Native Americans interested in development projects in San Joaquin County. Staff sent a letter to each of these individuals/groups on March 16, 2009, but has to date not received any responses.

Field Inventory Investigations

The Energy Commission's regulations require applicants to conduct surveys to identify previously unrecorded cultural resources in and near their proposed project areas. These surveys include a pedestrian archaeological survey and a built-environment windshield survey. The applicant includes the acquired new survey information as part of the information provided to staff in the AFC and may undertake additional field research, including geoarchaeological studies and site testing, to respond to staff's Data Requests. Staff may also undertake additional field research to supplement information provided by the applicant.

Summary of Results of Field Inventory Investigations

CH2MHill's archaeological survey did not yield evidence of archaeological deposits or built-environment resources in the project areas, except for a segment of the Western Pacific Railroad (WPRR), constructed around 1905. CH2MHill did not conduct a field survey of the built environment or undertake subsurface exploration.

Results of Pedestrian Archaeological Survey

CH2MHill conducted three archaeological pedestrian surveys of the LEC project areas. The first survey, conducted on June 26, 2008, covered the plant site and four temporary laydown and/or parking areas within the existing WPCF and STIG parcels, plus a 200-foot-wide buffer around these areas. The second survey, conducted on July 25, 2008, covered a previously considered route for the natural gas pipeline. A third pedestrian archaeological field survey covered the presently proposed natural gas pipeline route on February 5, 2009. Both of the field surveys of the proposed gas line route included a 50-foot buffer on either side of the route center line.

The archaeologists employed linear pedestrian transects spaced at 10 meters and opportunistic examination of exposed soils to determine whether archaeological deposits might be present. They carefully inspected exposed soils, consisting mainly of previously disturbed agricultural sediments and road bed material, but found no archaeological sites or isolates. Visibility of the ground surface varied from less than 10-50% within the laydown and/or parking areas, due to vegetation cover. Visibility was fair at approximately 40- 70% in the 50-foot buffer on either side of the revised gas line corridor (NCPA 2008a, pp. 5.3-8–5.3-11; NCPA 2009j, p. 4).

Results of Field Survey for Built-Environment Resources

Because CH2MHill's archival research identified no structures that were older than 45 years located on the project site or within 0.5 mile of the project areas, CH2MHill conducted no separate built-environment field survey. The pedestrian archaeological survey of the LEC's proposed natural gas pipeline's termination at the Union Pacific Railroad's (UPRR) West Armstrong Road railroad crossing, however, resulted in the recordation of a short stretch of the UPRR, formerly the WPRR, which was constructed between 1905 and 1909. CH2MHill's archaeological surveyors recorded a 100-foot-long segment of the rail line, limited to the 50 feet north and 50 feet south of the West Armstrong Road crossing (NCPA 2009a, pp. 5.3-8, 5.3-12).

Geoarchaeological Field Study

As discussed above (see "Archival Research Results"), in Data Request 13 Supplement staff requested a geoarchaeological field investigation, consisting of three backhoe trenches excavated to the maximum depth of the proposed construction, drawn and photographed stratigraphic profiles of the trenches, screening of samples of sediments from selected strata for cultural materials, recovery of samples for radiocarbon dating, and the geoarchaeologist's assessment, based on the field data, of the likelihood of the presence of buried archaeological deposits at the LEC plant site. NCPA refused to conduct such an investigation.

Summary of Identified Cultural Resources

The background research and archaeological field survey showed an absence of prehistoric and historic-period archaeological sites in the LEC project area of analysis. To date, Native Americans have identified no ethnographic resources on or near the LEC project areas. CH2MHill and staff identified only one cultural resource in or near the LEC project area, a built-environment resource, the WPRR, originally constructed between 1905 and 1909.

Determining the Historical Significance of Cultural Resources

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a "historical resource, which is a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource that is historically significant and eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[4] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

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

Historical resources must also possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

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

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially impact need be considered in staff's recommendations for mitigation measures for project impacts. Consequently staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

Evaluation of Cultural Resources Potentially Subject to Impact

Staff identified no known archaeological or ethnographic resources that could be eligible for the CRHR and that the proposed LEC project could impact. Staff, however, identified a built-environment resource, a portion of the WPRR, built between 1905 and 1909, as subject to possible project impact from the connection of the LEC's natural gas pipeline to PG&E's supply line. Because the WPRR is at least 50 years of age, staff must evaluate its eligibility for the CRHR according to the four eligibility criteria, above.

Such an evaluation was made for other parts of the WPRR rail line recorded and evaluated elsewhere in San Joaquin County as resource P-39-00098/CA-SJO-000292H. In 1994, JRP Historical Consulting provided a corporate history of the WPRR railroad and addressed the line's historical significance.[5] JRP recognized the line's "many very important and daring engineering features, including dozens of large bridges and tunnels" (JRP 1994, p. 5). JRP judged that the line's engineering accomplishments would probably qualify it for eligibility under Criterion C (CRHR Criterion 3). JRP reported, however, that those engineering feats were a response to the demands of difficult terrain, and so were not manifested in the San Joaquin Valley parts of the WPRR system. Thus JRP could not recommend the valley parts of the system as potentially eligible for the NRHP (JRP 1994, p. 5), and staff recommends that the part of the WPRR that the LEC project could impact is similarly not eligible for the CRHR under any of the CRHR criteria, based on JRP's evaluation.

Although a resource's integrity is of no relevance if the resource is not potentially eligible for listing on either the NRHP or the CRHR, recorders considering the potential eligibility of other parts of the WPRR system in San Joaquin County, subsequent to JRP's evaluation, have cited JRP's corporate history conveying the information that the UPRR, after its acquisition of the WPRR, undertook improvements that would allow larger locomotives and heavier freight cars to use the old line. Roadbed improvement,

[5] The JRP evaluation of the historical significance of the WPRR is in terms of its eligibility for listing on the National Register of Historic Places (NRHP), not for listing in the CRHR, but for the purposes of this analysis, NRHP eligibility and CRHR eligibility encompass the same qualities and are roughly equivalent. NRHP Criteria A–D are nearly identical to CRHR Criteria 1–4.

new ties, and heavier rails were included (JRP 1994, p. 4). These subsequent recorders have cited these improvements as compromising the integrity of the rail line (Larson and Johnson 2003; Jenson 2004). CH2MHill did not discuss the CRHR eligibility of the WPRR, but echoed the opinion that the segment they recorded lacks integrity due to modern improvements (NCPA 2009a, p. 5.3-14). Staff points out that the specific roadbed, ties, and rails subject to possible LEC impacts were not researched, and so no evidence regarding their integrity has been provided.

Summary of CRHR-Eligible Cultural Resources Subject To Potential Project Impacts

Staff has identified no known CRHR-eligible archaeological resources, ethnographic resources, built-environment resources, historic districts, or cultural landscapes in or near the proposed LEC project areas.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Method and Threshold for Determining Significance of Impacts to Historical Resources

Under CEQA, “a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment” (Pub. Resources Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of all historical resources identified in the Cultural Resources Inventory as CRHR eligible. The degree of significance of an impact depends on:

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

DIRECT AND INDIRECT IMPACTS

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction causes obsolescence and demolition or creates improved accessibility, making vandalism or greater weather exposure possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

To identify construction-related impacts to cultural resources that would need to be mitigated, staff first identifies all CRHR-eligible cultural resources (above). In the next step in its analysis, staff must evaluate the potential project impacts to the identified CRHR-eligible cultural resources to determine if these impacts are substantial and adverse.

Identification and Assessment of Direct Impacts and Recommended Mitigation

CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and a project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)). Previously unknown archaeological deposits can be encountered unexpectedly through any kind of ground-disturbing activities that are associated with project construction.

For the LEC, ground-disturbing activities would consist of (but may not be limited to):

1. Demolition, modification, or relocation of existing on-site structures at the plant site, including the storm water drainage system, the STIG plant's gas line, the STIG plant's reclaimed water supply line, and the STIG plant's cooling tower (NCPA 2009k p. 14; NCPA 2008b, Att. DA 5.15-6; NCPA 2008f, p. 33; CH2MHill2009c, pp. 4, 2-2);

2. Site preparation, including grubbing, clearing, and grading at the plant site (NCPA 2009k, p. 8);

3. Structure foundation and new pipeline trench excavations at the plant site, including water and site drainage pipelines (NCPA 2008a, p. 2-21, fig. 2.1-1; NCPA 2009k, p. 14; NCPA 2008b, Att. DA 5.15-6);

4. Foundation holes for two dead-end structures and as many as eight transmission line support structures (Grenier 2009);

5. Over-excavation and filling at the plant site, including the application of recycled site material and imported commercial fill to raise the “top of foundation” elevation above the 100-year-flood level (NCPA 2008f, pp. 15, 38);

6. Grading and graveling, possibly, at the nearby laydown and parking areas (NCPA 2009k, pp. 8–9);

7. Construction of a new, temporary, off-ramp from the southbound lane of I-5 to provide truck access to Cord Road (NCPA 2008a, p. 5.12-18);

8. Excavation of a trench, 24–48 inches wide, 48–96 inches deep, and 5–7 feet away from the existing STIG natural gas pipeline for most of the route, for the installation of the off-site, 14,122-foot-long, underground natural gas pipeline (NCPA 2009j, p. 2; NCPA 2009l, p. 10; Jones 2009);

9. Use of a 300-foot-by-300-foot temporary laydown area for storage and staging adjacent to the natural gas pipeline easement (NCPA 2009l, p. 9); and

10. Horizontal directional drilling to a depth of 6–7 feet, utilizing entry and exit pits measuring 100 feet by 150 feet, to install the natural gas pipeline under I-5 (NCPA 2009l, p. 10).

To the horizontal and vertical extent that they disturb previously undisturbed sediments, these activities have the potential to impact buried archaeological deposits, unknown at this time but assumed potentially eligible for the CRHR. Staff assumes a disturbed plow zone of three feet in depth, so the activities whose ground disturbance is shallow would not have an impact on intact buried archaeological deposits. Such activities would include numbers 2, 6, 7, and 9, above. NCPA indicates that the locations of several of the above activities have been previously disturbed, including the proposed plant site (disturbed by agriculture, the construction of the STIG plant, installation of underground utilities, and use as a storage area and for dumping) (NCPA 2008a, pp. 5.3-11–5.3-12), most of the natural gas pipeline route (disturbed by other pipelines) (NCPA 2008a, p. 5.3-11; NCPA 2008j, p. 4), and parts of the location of the proposed off-ramp (disturbed by soil borrowing) (NCPA 2009l, p. 9). None of the disturbance identified and described by NCPA would preclude the presence of intact archaeological deposits at depths in excess of three feet in any of the above areas.

Except for numbers 2, 6, 7, and 9, above, the other listed activities apparently would entail disturbance deeper than three feet. In response to a staff Data Request, CH2MHill provided the excavation depths for specific project features, ranging from 0–10 feet below sea level (NCPA 2008f, p. 14), or 5–15 feet below the current surface, which is well below the assumed depth of agricultural disturbance. An additional ground disturbance factor associated with the proposed LEC project is the possible requirement for remediation of contaminated soil at the site. At this time staff does not know to what extent horizontally and vertically that remediation would be carried out, so staff cannot evaluate the remediation as a potential impact to buried archaeological deposits that might be present.

While CH2MHill concluded that there is a low-to-moderate likelihood of encountering buried intact archaeological resources at the proposed plant site near the ground

surface, the consultant indicated that some potential does exist for intact cultural resources to be discovered in soils below the plow zone (NCPA 2008a, pp. 5.3-11–5.3-12). Consequently, in recognition of the possibility of buried archaeological deposits being encountered unexpectedly during project excavations, NCPA recommended a set of contingency mitigation measures. These measures included (NCPA 2008a, p. 5.3-15):

1. Designation of an on-call CRS to investigate any cultural resources finds made during construction;

2. Implementation of a construction worker training program;

3. Monitoring during initial clearing of the power plant site and excavation at the plant site;

4. Procedures for halting construction in the event that there is an inadvertent discovery of archaeological deposits or human remains;

5. Procedures for evaluating an inadvertent archaeological discovery; and

6. Procedures to mitigate adverse impacts on any inadvertent archaeological discovery determined significant.

Although staff concurs with many of NCPA's suggested mitigation measures and agrees that the likelihood of the proposed project impacting buried cultural resources in the previously disturbed upper sediments is low, NCPA has provided insufficient data about the depositional history of the project area sediment sequence to rule out the potential presence of archaeological deposits at greater depths. Moreover, based on the opinion of its geomorphology expert, Dr. Spaulding, NCPA has refused to provide the stratigraphic data staff has requested.

NCPA may have inadvertently misapplied an expert opinion on the historical geomorphology of the proposed project area to the question of how the Energy Commission ought to comply with CEQA under the agency's certified regulatory program. Dr. Spaulding is a distinguished scholar and consummate professional in a number of subdisciplines in the broad field of Quaternary Science. His expert opinion on the likelihood of the presence of buried archaeological deposits in the project area, while pertinent to the analysis of potential project impacts, does not carry the weight of fact. Energy Commission staff has the obligation under the agency's certified regulatory program to demonstrate due diligence in the pursuit of a factual basis to support staff conclusions in the agency's environmental documents. The purpose of Data Request Supplement 13 was to gather an appropriate level of factual information to support a public assessment of the potential for the construction of the project to significantly and adversely impact cultural resources, and, in the absence of such information prior to Energy Commission certification of the project, to evidence substantive consideration of and mitigation for such impacts prior to the onset of project construction. As NCPA has chosen not to provide the information that staff requests in Data Request Supplement 13, staff is left to pursue the information through alternative means.

The lack of pertinent site-specific subsurface data has prevented staff from completing its assessment of potential project impacts on buried cultural resources and optimally configuring the appropriate mitigation measures. In the absence of such data, staff must propose conditions of certification requiring both archaeological monitoring for as-yet-unidentified buried archaeological deposits as a contingency mitigation measure during project-related excavation and a post-certification geoarchaeological field study whose results would be used to configure the proposed archaeological monitoring. Consequently, as the only mitigation required for this project's potential impacts to cultural resources, staff proposes Conditions of Certification **CUL-1** through **CUL-10**, below.

Staff's proposed **CUL-1** requires that a geoarchaeologist conduct a study of the project site and write a report for submittal to the project owner, to the project Cultural Resources Specialist (CRS), and to the Energy Commission's Compliance Project Manager (CPM). **CUL-2** requires the CRS to be available during the geoarchaeological field work and during the LEC's construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. Under **CUL-3**, the CRS would evaluate for CRHR-eligibility any buried archaeological deposits encountered during geoarchaeological field work. Under **CUL-4**, the CRS would conduct data recovery from any buried archaeological deposits encountered during the geoarchaeological field work that the CRS recommended to be eligible for the CRHR.

Staff's proposed **CUL-5** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-6** requires that the CRS write and submit for CPM approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), including the results of the geoarchaeological study, the evaluations of any buried archaeological deposits encountered during the geoarchaeological field work, and data recovery plans for any evaluated archaeological deposits determined CRHR-eligible by the CPM. **CUL-7** requires the CRS to write and submit to the CPM a final report on all LEC cultural resources monitoring and mitigation activities. **CUL-8** requires the project owner to train workers to recognize cultural resources.

CUL-9 uses the recommendations, as approved by the CPM, of the geoarchaeological study and the results of any data recovery from CRHR-eligible archaeological deposits encountered during geoarchaeological field work, to configure the archaeological monitoring intended to identify buried prehistoric archaeological deposits, prescribing how much monitoring at what locations and depths in the project areas would be most consistent with CEQA requirements for mitigation of impacts through avoidance, when possible, and with the preservation goal of recovering valid scientific data from CRHR-eligible archaeological deposits whose destruction cannot be avoided. A Native American monitor would be included to observe ground disturbance, comment on any discoveries, and represent Native American heritage concerns.

Finally, **CUL-10** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible.

Under staff's proposed conditions of certification, the completion of the geoarchaeological field study and the incorporation of its results and recommendations into the archaeological monitoring protocol would improve the proposed mitigation in a number of ways. It would make the monitoring more precise, efficient, and effective at preventing damage to discovered deposits. It would also possibly reduce the extent and/or duration of archaeological monitoring, or even eliminate the need for it entirely. With the possible discovery, evaluation, and recovery of data from CRHR-eligible archaeological deposits identified and appropriately treated during the geoarchaeological field study, before the start of construction, it would avoid construction delays that would be necessary if these deposits were discovered during construction. During construction, the project owner could be prepared in advance for the need for possible redirection of work when sediment layers identified as sensitive for archaeological deposits are reached and could thus more easily accommodate the redirection if it should prove necessary due to the discovery of a deposit. Finally, and most importantly for the purposes of historic preservation, the professional standards for the appropriate treatment of archaeological deposits would be met—such deposits would be identified in the least destructive way possible, under the circumstances, evaluated for CRHR eligibility, and, if eligible, processed by traditional archaeological techniques to yield their scientifically consequential data.

Identification and Assessment of Indirect Impacts and Recommended Mitigation

Neither NCPA nor staff identified any indirect impacts to any previously identified cultural resources in staff's project areas analysis for the proposed project, and so no mitigation measures for indirect impacts would be required for cultural resources.

Operation Impacts and Mitigation

During operation of the proposed power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. Thus such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed for mitigating impacts to previously unknown CRHR-eligible archaeological resources discovered during the original project-related ground disturbance at the main project site and along linear facilities, proposed Conditions of Certification **CUL-4** through **CUL-10**, would continue to apply and so also serve to mitigate impacts from repairs occurring during the later operation of the plant.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in the LEC project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed LEC, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of the LEC and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric

and historic. The alteration of the LEC setting which could be caused by the construction and operation of the proposed LEC and other proposed projects in the vicinity could be cumulatively considerable, but may/may not be a significant impact to cultural resources.

In its cumulative impact analysis for the proposed LEC project in the AFC, NCPA identified 21 projects in various stages of progress under permitting by the City of Lodi. Most of the projects in Lodi are zoned residential, with some mixed uses, institutional, commercial, and industrial projects also proposed. As of July, 2008, 72 projects were under consideration by San Joaquin County. These projects would all be located more than four miles from the LEC, except for the improvements at the White Slough WPCF, which is adjacent to the project site (NCPA 2008a, pp. 5.6-25–5.6-26).

The construction of other projects in the same vicinity as the proposed LEC, such as the currently proposed White Slough improvements project, could affect unknown subsurface archaeological deposits (both prehistoric and historic). The implementation of mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR) by other, future projects in the same vicinity as the proposed LEC can mitigate impacts to as-yet-undiscovered subsurface archaeological deposits to a less than significant level, thereby mitigating any adverse cumulative impacts.

CH2MHill evaluated the cumulative impact to cultural resources of any nearby projects, in combination with the LEC project, as minor. CH2MHill, therefore, concluded that the LEC, along with the other identified projects in the vicinity, would be unlikely to result in significant cumulative impacts to cultural resources (NCPA 2008a, pp. 5.6-14–5.6-15. No cultural resources studies generated by city and county projects have been available to staff, and therefore staff has identified no CRHR-eligible resources that could be affected by these projects.

Proponents of any other future projects in the LEC area could mitigate impacts to as-yet-undiscovered subsurface archaeological sites to less-than-significant levels by requiring archaeological monitoring protocols for ground disturbance that are developed on the basis of the results of geoarchaeological analyses, evaluation of resources discovered during monitoring, and avoidance or data recovery. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code section 5097.98.

Since the impacts from the proposed LEC project would be mitigated to a less-than-significant level by the project's compliance with proposed Conditions of Certification **CUL-1** through **CUL-10**, and since similar protocols can be applied to other projects in the area, staff does not expect any incremental effects on cultural resources of the proposed LEC project to be cumulatively considerable when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If the Conditions of Certification (below) are properly implemented, the proposed LEC project would result in a less-than-significant impact on known and newly found cultural resources. The project would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Table 1.

San Joaquin County's General Plan has language promoting the general county-wide preservation of cultural resources. With regard to objectives relating to the preservation of cultural resources, the San Joaquin County 2010 General Plan aims to "protect San Joaquin County's valuable architectural, historical, archaeological, and cultural resources" (San Joaquin County 1992). The City of Lodi's General Plan has as one of its goals that the city will "preserve and enhance the city's historical heritage." (City of Lodi 1991, Section 10, Goal J). Staff's proposed conditions of certification require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. Consequently, if NCPA implements these conditions, its actions would be consistent with the general historic preservation goals of San Joaquin County and the City of Lodi.

CONCLUSIONS AND RECOMMENDATIONS

Staff identified no known cultural resources that the construction of the proposed LEC project would significantly impact. Staff cannot, however, conclude that the LEC project would have no significant impact on potentially CRHR-eligible archaeological resources present on the site, buried deeper than three feet below the surface and at this time unidentified. To conclude its analysis of the LEC project's potential impacts on such buried resources, staff needs the following additional information from NCPA:

- A detailed description of the extent horizontally and vertically of over-excavation and filling that would be done to raise the entire LEC site above the 100-year flood zone, because the over-excavation could impact unidentified buried archaeological resources and staff needs to know how extensive this impact would be; and
- A detailed description of the extent horizontally and vertically of soil remediation that would be required, because this activity
    - Could impact unidentified buried archaeological resources,
    - Would modify the parameters of the field study that staff proposes in **CUL-1**, and
    - Could present an opportunity for a pre-certification coordinated geoarchaeological field study, perhaps eliminating the need for the post-certification geoarchaeological field study staff is proposing in **CUL-1**.

Staff assumes that NCPA would be able to provide the former information for incorporation into staff's discussion of potential project impacts in the SA and for use as one factor in staff's specifying the extent of archaeological monitoring required in **CUL-9**.

PROPOSED CONDITIONS OF CERTIFICATION

It is important to note that the successful execution of **CUL-1** through **CUL-4** and **CUL-6** requires careful and concurrent coordination between the Project Geoarchaeologist and the Cultural Resources Specialist.

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "construction ground disturbance," and "construction grading, boring, and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Project Geoarchaeologist (PG).

PROJECT GEOARCHAEOLOGIST

The resume for the PG shall include information demonstrating to the satisfaction of the CPM that the PG's training and background conform to the U.S. Secretary of Interior's Professional Qualifications Standards for prehistoric or historical archaeology, as published in Title 36, Code of Federal Regulations, part 61, and showing the completion of graduate-level coursework in geoarchaeology, physical geography, geomorphology, or Quaternary science, or education and experience acceptable to the CPM.

The resume of the PG shall include the names and telephone numbers of contacts familiar with the work of the PG, as a professional geoarchaeologist, on referenced projects, and demonstrate to the satisfaction of the CPM that the PG has the appropriate training and experience to undertake the required geoarchaeological study.

The project owner shall ensure that the PG conducts a geoarchaeological study of the Lodi Energy Center project area(s), directing that the PG undertake, at a minimum, the following:

GEOARCHAEOLOGICAL FIELD STUDY

1. Review the project cultural resources data generated during the Energy Commission certification process by both the applicant and Energy Commission staff (to be provided by the project owner);

2. Conduct further research, if needed, on the northern San Joaquin Valley and Delta region in the extant literatures for archaeology, geoarchaeology, and Quaternary science, supported, as appropriate, by a field reconnaissance of the project construction areas, and generate a general description of the landforms in the vicinity of the project site, a large scale (≥1:12,000) map of the landforms, and an account of the geomorphic history of the project site vicinity to provide an understanding of the formation of the landforms on which proposed LEC project components would be located, the ages of these landforms as they may relate to human occupation, and the geomorphic forces that have shaped the landforms and affected the three-dimensional distribution of the potential array of archaeological deposits in the construction areas;

3. Devise and submit for CPM approval a research plan for a geoarchaeological field study, including personnel, equipment, and analytic techniques, to determine the precise physical character and ages of, and the depositional rates for, the sedimentary facies and the paleosols in the project construction area(s) where the maximum depths of excavation into native soils and sediments would be reached, using the following methods (or proposing alternative methods to obtain the required data):

   A. Excavate on the plant site at least 30 linear meters of 1-meter-wide cross-trenches (trenches at right angles to one another), placed to provide the opportunity to reliably characterize the stratigraphy of the site to the anticipated maximum depth of the proposed construction; the trench walls should be shored or stepped as required for safety;

   B. Select one representative 1-meter-wide profile for each 10 linear meters of trench and record the stratigraphy of each of the profiles by completing a measured profile drawing, a complete profile photograph with a vertical metric scale, and a thorough written description of the character of each lithostratigraphic and pedostratigraphic unit in each profile;

   C. Screen through ¼-inch hardware cloth a small (three 5-gallon buckets) sample of sediment from the major lithostratigraphic units in each profile, or from 50-centimeter arbitrary levels down each profile, where such lithostratigraphic units or sequences are not apparent;

   D. Collect and assay enough soil humate samples from each profile to determine the depositional rates and approximate age of the major process-related lithostratigraphic sequences present on the plant site;

   E. Immediately inform the project owner, the CRS, and the CPM of any buried archaeological deposits encountered during geoarchaeological data collection, but continue the geoarchaeological investigation and maintain decision-making authority over it;

   F. Mechanically excavate through any buried archaeological deposits encountered (unless containing human remains), using arbitrary levels no greater than 20 cm thick, screen the arbitrary levels through ¼-inch hardware cloth, and provenience all artifacts, ecofacts, and other material culture finds to those arbitrary levels; and

   G. Record any such encountered archaeological deposits on DPR 523 “Primary Record” and “Archaeological Site Record” forms (Forms 523A and C), limiting descriptions to only those portions of the deposits within the trench(es).

4. Conduct the geoarchaeological field study according to the CPM-approved research plan, provide a draft report of the field study to the CRS and CPM, and, for CPM approval, provide a final geoarchaeological field report to the project owner, the CRS, and the CPM that:

   A. Describes and maps, based on the extant literature and any new primary field data, the historical geomorphology of the project's construction areas;

   B. Presents, in graphic and written form, a master column that characterizes the stratigraphy of the project's power block area to the maximum depth that ground disturbance will occur there;

   C. Provides a processual geologic interpretation and the approximate age of subdivisions of the master column that reflect shifts in local depositional regimes or depositional history, and that reflect time ranges that correspond to the prehistory and history of the region, as presently understood;

   D. Presents descriptions of any encountered archaeological deposits that include descriptions of the material culture content, the character of the sedimentary matrix for each deposit, and an assessment of the approximate age of each deposit;

   E. Provides a preliminary interpretation of the character of the prehistoric or historic land use that each encountered archaeological deposit represents;

   F. Analyzes the data from the above field study and from the literature review, provides an assessment, based on those data, of the likelihood that the project will encounter buried archaeological deposits, and, to the extent possible, and interprets the likely age and character of such deposits; and interprets, on the basis of the current understanding of the prehistory and history of the region, what site types of what age are most likely to be found;

   G. Recommends, based on the geoarchaeological field study and the results of any data recovery from CRHR-eligible archaeological deposits encountered during geoarchaeological field work, the locations and extent (horizontal and vertical) of archaeological monitoring required, for both historic-period and prehistoric deposits, prescribing how much monitoring at what locations and depths in the project areas would be most consistent with CEQA requirements for mitigation of impacts through avoidance, when possible, and with the preservation goal of recovering valid scientific data from CRHR-eligible archaeological deposits whose destruction cannot be avoided; and

   H. Includes an appendix of completed DPR 523 forms for any archaeological deposits encountered and recorded during the geoarchaeological field investigations.

The PG may elect to obtain other specialized technical services, such as radiometric dating, to assist in data-gathering and data-interpretation. The project owner shall ensure that the PG completes and submits a final geoarchaeological field report to the project owner and to the CPM, for approval. No ground disturbance shall occur prior to CPM approval of the PG and prior to CPM approval of the geoarchaeological report, unless specifically approved by the CPM.

Verification:

1. At least 160 days prior to the start of ground disturbance, the project owner shall provide the resume of the PG to the CPM, for review and approval.

2. At least 135 days prior to the start of ground disturbance, the project owner shall submit the PG's research plan for a geoarchaeological field study to the CPM for review and approval.

3. At least 120 days prior to the start of ground disturbance, the project owner shall notify the CPM by letter or in an email that the PG has initiated the CPM-approved geoarchaeological study.

4. Within 48 hours of the discovery of an archaeological or ethnographic resource during geoarchaeological data collection, the project owner shall ensure that the PG or the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

5. No later than 10 days subsequent to encountering buried prehistoric archaeological deposits during geoarchaeological data collection, the project owner shall submit to the CPM copies of the letters sent to the Chairpersons of the Native American groups who requested to be informed of the discovery of such deposits.

6. At least 80 days prior to the start of ground disturbance, the project owner shall provide copies of the PG's draft technical geoarchaeological report to the CRS and the CPM.

7. At least 60 days prior to the start of ground disturbance, the project owner shall provide copies of the PG's final technical geoarchaeological report to the CRS and the CPM.

CUL-2 Prior to the start of ground disturbance, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternate CRSs, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to CPM approval of the CRS and alternates,

unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;

2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. A B.S. or B.A. degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. An A.S. or A.A. degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. Enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 160 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to the start of geoarchaeological field work, the project owner shall confirm in writing to the CPM that the approved CRS will be available for on-site work for the duration of the geoarchaeological field work and is prepared to implement cultural resources Conditions **CUL-3** and **CUL-4** at the conclusion of the geoarchaeological field work.

3. Within three days after the completion of geoarchaeological field work, if no buried archaeological deposits were encountered during that field work, the project owner may suspend the duties of the CRS until the CRS is needed to implement cultural resources Conditions **CUL-6** through **CUL-10**, or if the CPM approves any ground disturbance.

4. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that project-related ground disturbance may continue up to a maximum of three days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

5. 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 resources monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.

6. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

7. 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 onsite work and is prepared to implement cultural resources Conditions.

CUL-3 Prior to the start of ground disturbance, and before completion of the geoarchaeological field work, if any buried archaeological deposits are encountered during that field work that the project's construction would partially or wholly destroy, the project owner shall ensure that the CRS devises an evaluation-phase research design to gather data with which to complete the description of the deposits and to evaluate their CRHR eligibility.

This research design shall provide for determining the lateral and vertical dimensions of the deposits, assessing the differential distribution of anthropogenic materials within the deposits, identifying what data sets the deposits contain and to what research questions these data sets could be applied, updating with newly acquired information the DPR 523C "Archaeological Site Record" forms completed by the PG, and making recommendations on the CRHR-eligibility of the deposits. These eligibility recommendations, and data recovery plans for any archaeological deposits recommended as CRHR-eligible, shall be incorporated into the Cultural Resources Monitoring and Mitigation Plan (CRMMP, see **CUL-6**).

No project-related ground disturbance shall occur until all CRHR-eligibility evaluations of buried archaeological deposits encountered during geoarchaeological field work have been completed, unless such activities are specifically approved by the CPM.

Verification:

1. Within three days of the completion of geoarchaeological field work, the project owner shall submit for CPM approval an evaluation-phase research design, devised by the CRS, to evaluate the CRHR-eligibility of any buried archaeological deposits encountered during that field work.

2. Within three days of CPM approval of the research design, the project owner shall notify the CPM by letter or email that the CRS has initiated the implementation of the approved evaluation-phase research design.

3. Within five days of the completion of the evaluation of the CRHR-eligibility of the buried archaeological deposits by the CRS, the project owner shall submit for CPM review the DPR 523C "Archeological Site Record" forms, updated by the CRS and including recommendations on the CRHR-eligibility of the evaluated deposits.

CUL-4 If buried archaeological deposits are encountered during the geoarchaeological field work, prior to the start of ground disturbance and after the CPM has approved the CRS's data recovery plans (submitted in the CRMMP) for any CRHR-eligible (as determined by the CPM) buried archaeological deposits that were encountered during the geoarchaeological field work and that would be unavoidably partially or wholly destroyed by the project's construction, the project owner shall ensure that the CRS implements the CPM-approved data recovery plans.

The project owner shall ensure that the CRS facilitates the participation of any Native Americans who want to observe the excavation of any buried prehistoric archaeological deposits encountered during geoarchaeological data collection.

Evaluations and data recovery conducted under **CUL-3** and **CUL-4** shall be reported fully in the final Cultural Resources Report (CRR, see **CUL-7**).

No project-related ground disturbance shall occur until all required data recovery has been completed, unless such activities are specifically approved by the CPM.

Verification:

1. Within three days of CPM approval of the CRS's proposed data recovery plans (included in the CRMMP, but subject to separate approval) for CRHR-eligible archaeological deposits (as determined by the CPM) encountered during the geoarchaeological field work, the project owner shall notify the CPM by letter or email that the CRS has initiated the implementation of the approved data recovery plans.

2. Within three days of the completion of data recovery from the CRHR-eligible archaeological deposits through the implementation of the CPM-approved data recovery plans, the project owner shall inform the CPM in a letter or email that data recovery has been completed.

CUL-5 Prior to the start of ground disturbance, the project owner shall provide to the PG and the CRS, if the CRS has not previously worked on the project, copies of the AFC, data responses, confidential cultural resources reports, all supplements, and the Energy Commission's Staff Assessment (SA) for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the PG or the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PG, CRS, and CPM. The CPM shall review map submittals and, in consultation with the PG and CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 150 days prior to the start of ground disturbance, the project owner shall provide copies of the AFC, data responses, confidential cultural resources

documents, all supplements, and the Energy Commission SA to the PG and the CRS (if needed) and copies of the subject maps and drawings to the PG, CRS, and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

4. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within five days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-6 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the author's name shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources and shall incorporate the results of the geoarchaeological field study as reported to the CRS in the draft technical report for that study. 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 CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

2. An archaeological research design, scoped, to the extent feasible, to the time periods and the archaeological resource types established by the geoarchaeological field study, and by the results, if any, of the

evaluations made by the CRS under **CUL-3**, that includes a discussion of research questions and testable hypotheses applicable to the project's construction areas;

3. If buried archaeological deposits were encountered during the geoarchaeological field work and evaluated by the CRS under **CUL-3**, a data recovery plan for each CRHR-eligible (as determined by the CPM) buried archaeological deposit unavoidably subject to partial or complete destruction by the project; these data recovery plans are not required if no buried archaeological deposits were encountered during the geoarchaeological field work;

4. A discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. A prescriptive treatment plan may be included in the CRMMP for limited data types;

5. A detailed monitoring plan for the plant site and all underground linear facilities that is configured by the results of the geoarchaeological field work conducted under **CUL-1**;

6. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance phase and the post-ground disturbance analysis phase of the project;

7. 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;

8. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities;

9. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during project-related ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related effects;

10. A statement that all cultural resources encountered shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical

Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum;

11. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities;

12. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively; and

13. A description of the contents and format of the final Cultural Resource Report (CRR), which shall be prepared according to Archaeological Resource Management Report (ARMR) guidelines.

Verification:

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the CRS an electronic copy of the draft model CRMMP.

2. If buried archaeological deposits were encountered during the geoarchaeological field work, at least 70 days prior to the start of ground disturbance, the project owner shall submit the subject CRMMP to the CPM for the immediate review and approval of just the proposed data recovery plans, with the CPM's review and approval of the remainder of the CRMMP reserved until the field activities, if any, under **CUL-4** are completed. **Or**, if no buried archaeological deposits were encountered during the geoarchaeological field work, at least 30 days prior to the start of ground disturbance, the project owner shall submit the subject CRMMP to the CPM for review and approval of the entire CRMMP.

3. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-7 The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, evaluations, data recovery, samplings, analyses, and results. All survey reports, DPR 523 forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and

submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

2. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

3. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

4. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-8 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 at the project site, laydown area, and along the linear facilities routes. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes. 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. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;

4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;

5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

6. 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;

7. An informational brochure that identifies reporting procedures in the event of a discovery;

8. An acknowledgement form signed by each worker indicating that they have received the training; and

9. 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 such activities are specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

3. On a monthly basis, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-9 To ensure there are no impacts to unknown buried archaeological resources, the project owner shall ensure that the CRS, alternate CRS, or CRMs monitor ground disturbance at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas, according to the recommendations of the geoarchaeological field study required in **CUL-1**, and as approved by the CPM.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

A Native American monitor shall be obtained to monitor ground disturbance in areas and at depths, if any, where the **CUL-1** geoarchaeological study identified the potential for buried prehistoric archaeological deposits and anywhere else that Native American artifacts are encountered during ground disturbance. Contact lists of interested 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. 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.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of the earth-removing activities in the areas specified in the previous two paragraphs, for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least two monitors per excavation area, where excavation equipment is actively removing dirt and hauling the excavated material further than fifty feet from the location of active excavation. In such a scenario, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated dirt is dumped no further than fifty feet from the location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of cultural resources-related activities at the project site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties

assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

2. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

3. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

4. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.

5. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

6. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

7. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

CUL-10 The project owner shall grant authority to halt project-related ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a

discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event a cultural resource over 50 years of age (or if younger, determined exceptionally significant by the CPM) is found, or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting as provided in these conditions shall continue during all ground-disturbing activities elsewhere on the project site. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), of the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 “Primary” form. The “Description” entry of the DPR 523 “Primary” form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.

4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS’s proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of 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 project-related ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Within 48 hours of the discovery of an archaeological or ethnographic resource, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

CULTURAL RESOURCES ACRONYM GLOSSARY

AFC	Application for Certification
AD	After the Birth of Christ
ARMR	Archaeological Resource Management Report
BC	Before the Birth of Christ
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
LEC	Lodi Energy Center
LORS	Laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NCPA	Northern California Power Agency
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation

Project Area Of Analysis The area within and around a project site that staff considers when compiling an inventory of cultural resources and when assessing potential impacts

Project Site The bounded area identified by the applicant as the area within which they propose to build the project

SA Staff Assessment

SHPO State Historic Preservation Officer

Staff Energy Commission cultural resources technical staff

STIG Northern California Power Agency 49-MW power plant, west of proposed LEC

WEAP Worker Environmental Awareness Program

WPCF White Slough Water Pollution Control Facility, east of proposed LEC

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HAZARDOUS MATERIALS MANAGEMENT

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

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Lodi Energy Center (LEC), along with staff's proposed mitigation measures, indicates that hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards. A Risk Management Plan (RMP) has been prepared by the Northern California Power Agency (the applicant) for the existing Combustion Turbine Project #2 (STIG plant) and approved by the San Joaquin County Office of Emergency Services (SJCOES). Since the LEC would use the same ammonia storage facility as the STIG plant, the current approved RMP is adequate to fulfill the requirements of the Health and Safety Code, section 25531 et seq. At a site visit on June 4, 2009, Energy Commission staff reviewed the RMP and site security and found both to be adequate.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed LEC has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **WORKER SAFETY AND FIRE PROTECTION** section of this document describes applicable requirements for the protection of workers from these risks.

Anhydrous ammonia (99% NH_3) is the only hazardous material proposed to be either used or stored at the LEC project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (LEC 2008a, Tables 5.5-1, 5.5-2, and 5.5-3). Anhydrous ammonia will be used to control oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of anhydrous ammonia increases the risk that would otherwise be associated with the use of the less hazardous aqueous form of ammonia. Anhydrous ammonia is stored as a liquefied gas at high pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, biocides and welding gasses will be present at the proposed LEC project. No acutely

toxic hazardous materials will be used on site during construction, and none of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility.

Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed LEC would require the construction of approximately 2.5 miles of new gas pipeline to connect to a Pacific Gas and Electric (PG&E) natural gas line near the intersection of the Western Pacific Railroad and Armstrong Road (LEC 2008a, Section 4.0). The LEC project would also require the transportation of anhydrous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

Hazardous Materials Management Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r)	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.

Applicable Law	Description
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to 515	Sets forth requirements for the design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified Unified Program Agency for approval.
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.”

Applicable Law	Description
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
California Public Utilities Commission General Order 112-E and 58-A	Contains standards for gas piping construction and service.
Local	
San Joaquin County CUPA Program (Health and Safety Code Section 25180; San Joaquin County Board of Supervisors Resolution R-95-760)	To consolidate, coordinate and make consistent the administrative requirements, permitting, inspection, activities, and fees for hazardous waste and hazardous materials programs in each jurisdiction.
San Joaquin County Environmental Health Emergency Response Program (California Health and Safety Code Sections 25200 et seq. and 101040)	Interagency emergency response team guidelines for incidents involving hazardous material spills or releases, including health assessments to evaluate actual or potential environmental contamination and/or human exposure, recommendations for short and long-term cleanup, and oversight of the cleanup activities performed by the responsible parties or environmental assessment firms. The San Joaquin County Environmental Health Dept. was approved by the State as the CUPA for San Joaquin County in January of 1997 but the SJC Office of Emergency Services is a Participating Agency (PA) administering the Hazardous Material Release Response Plan and Inventories and the Accidental Release Prevention (Cal-ARP) programs.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the San Joaquin County Office of Emergency Services (SJCOES). With regard to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the California Code of Regulations Title 24 and the 2007 California Building Code (LEC 2008a, Section 2.4.1.2).

SETTING

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

- Local meteorology;

- Terrain characteristics; and
- Location of population centers and sensitive receptors relative to the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and directions are described in the **AIR QUALITY** section (5.1) of the Application for Certification (AFC) (LEC 2008a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 108°F are appropriate for conducting the off-site consequence analysis

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The topography of the site is essentially flat (approximately at sea level) with no elevated terrain existing for many miles in all directions (LEC 2008a, Section 5.1.1.1).

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. Sensitive receptors in the project vicinity are listed and shown in Appendix 5.9A of the AFC (LEC 2008a). There are a total of 15 daycare facilities and two schools within a 3-mile radius of the project. The nearest sensitive receptor is a daycare center approximately 2.1 miles south of the project site. The nearest school is the Julia Morgan Elementary, located approximately 2.9 miles southeast of the site (LEC 2008a, Section 5.5.1.1). The nearest residence is located approximately 0.75 miles north of the project site (LEC 2008a, Section 5.9.3).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous

materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (LEC 2008a, Section 5.5). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Tables 5.5-1 through 5.5-3 of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to

the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, small quantities of hazardous materials such as paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, and welding flux would be used. Any impact of spills or other releases of these materials will be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities. Handling of hazardous materials during construction would follow Best Management Practices (BMPs) to minimize environmental effects (LEC 2008a, Section 5.5.2.3.1).

During operations, hazardous chemicals such as cleaning agents, lube oil, mineral insulating oil, hydrogen gas, water treatment chemicals, and other various chemicals (see **HAZARDOUS MATERIALS APPENDIX B** for a list of all chemicals proposed to be used and stored at the LEC) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and anhydrous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of the Staff Assessment (SA) as per staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90% in concentration. Methane is flammable when mixed in air at concentrations of 5-14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is

less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but can explode under certain conditions (as demonstrated by the recent natural gas detonation in Belgium in July 2004).

While natural gas will be used in significant quantities, it will not be stored on site. It will be delivered via a new offsite pipeline that will connect the LEC site with PG&E gas pipeline #108, approximately 2.5 miles away. The new gas pipeline would be installed parallel to the existing 3-mile pipeline that serves the Northern California Power Agency (NCPA) Combustion Turbine Project #2 (STIG plant) (LEC 2008a, Section 4.0). The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start up, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas, and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

The natural gas pipeline will be designed for Class 1 service (applies to pipelines located in areas with 10 or fewer buildings intended for human occupancy) and will meet California Public Utilities Commission General Order 112-D and 58-A standards, and 49 CFR 192 standards (LEC 2008a, Sections 5.5.2.5). In addition, CPUC General Order 112-E, Section 125.1 requires that at least 30 days prior to the construction of a new pipeline, the owner must file a report with the commission that will include a route map for the pipeline. 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 (see Table 1 LORS).

Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure.

Anhydrous Ammonia

Anhydrous ammonia will be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the LEC. The accidental release of anhydrous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. LEC will tie into the existing anhydrous ammonia stationary above ground storage tank currently in use at the STIG power plant. The tank has an approximate capacity of 12,000 gallons and is filled to a maximum of 10,200 gallons (LEC 2008a, Section 5.5.2.3.2).

Based on staff's analysis described above, anhydrous ammonia is the only hazardous material that may pose the risk of off-site impact. The use of anhydrous 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 high vapor pressure and the large amounts of anhydrous ammonia that will be used and stored on site.

To assess the potential impacts associated with an accidental release of anhydrous ammonia, staff uses four bench mark exposure levels of ammonia gas occurring offsite. These include:

1. The lowest concentration posing a risk of lethality, 2,000 ppm;

2. The immediately dangerous to life and health level of 300 ppm;

3. The emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by US EPA and California; and

4. The level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm (considered by staff to be a level of significance).

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **HAZARDOUS MATERIALS APPENDIX A**.

Staff reviewed the RMP for the existing anhydrous ammonia storage tank at the STIG power plant. The RMP had been recently revised and was approved by the San Joaquin County Office of Emergency Services in February 2009. Staff determined that the modeling parameters used for the worst-case accidental releases of anhydrous ammonia in the applicant's off-site consequence analysis (OCA) were as per federal and state regulations. Staff also inspected the tank, secondary containment, and the placement of pipes, valves, and sensors. Because the tank will not be relocated or increased in size, will only be filled more frequently, and the applicant will add additional sensors and a water spray deluge system, staff feels it appropriate to rely on the existing OCA and approval from San Joaquin County and not conduct its own air dispersion modeling.

Staff believes that the potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of control systems and a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan, specific to the anhydrous ammonia tank as wells as for other components of the facility, are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the LEC project include:

- Construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery plus the volume of water associated with 20 minutes of fire protection;
- Physical separation of stored chemicals in isolated containment areas with a non-combustible partition in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- Installation of a fire protection system for indoor hazardous materials storage areas including automatic sprinklers and an exhaust system;
- Continued use of an existing bermed containment area surrounding the anhydrous ammonia storage tank capable of holding the entire tank volume;
- Maintaining an existing ammonia sensor and adding additional sensors; and
- Process protective systems including continuous tank level monitors, automated leak detectors, temperature and pressure monitors, alarms, excess flow and emergency block valves, and a water spray deluge system for the anhydrous ammonia tank.

Administrative Controls

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

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **WORKER SAFETY AND FIRE PROTECTION** section for specific regulatory requirements):

- Worker training regarding chemical hazards, health and safety issues, and hazard communication;
- Procedures to ensure the proper use of personal protective equipment;
- Safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;
- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to

halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant has already prepared a risk management plan for anhydrous ammonia, as required by 42 USC §112(r) and CalARP regulations for the existing STIG plant. The RMP includes a hazard assessment and a program for preventing and responding to accidental releases. In addition, a Process Safety Management Plan (PSMP) for anhydrous ammonia was prepared for the STIG plant. This plan was also reviewed by staff and found to be adequate.

The existing STIG hazardous materials business plan (HMBP) which incorporates state requirements for the handling of hazardous materials would be updated by the applicant (LEC 2008a, Section 5.5.4.2.1). Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-2** (development of a safety management plan).

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The first responders to a hazardous materials incident would be Station #4 of the Woodbridge Fire Protection District (WFPD). Backup support would be provided by the City of Stockton Fire Department and the City of Lodi Fire Department. In the event of a large spill, the San Joaquin County Office of Emergency Services Hazardous Materials Response Team would also respond. These hazardous response teams are capable of handling any hazardous materials-related incident at the proposed facility with an adequate response time (LEC 2008a, Section 5.5.2.5 and WFPD 2009).

Transportation of Hazardous Materials

Hazardous materials including anhydrous ammonia will be transported to the facility by tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of anhydrous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on I-5 and exit either at the SR-12 interchange (if coming from north) or at West Eight Mile Road (if coming from south), and then travel on North Thornton Road to Frontage Road to North Cord Road to the project site (LEC 2008a, Section 5.5.4.2.5). There are no schools or parks along the proposed route (LEC 2008a, Section 5.5.2.6). A residential neighborhood exists south of Eight Mile Rd along the southern delivery route.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend upon the location of the accident and the rate

of dispersion of ammonia vapor from the surface of the anhydrous ammonia pool. The likelihood of an accidental release during transport is dependent upon three factors:

- The skill of the tanker truck driver;
- The type of vehicle used for transport; and
- Accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (I-5). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence. See AFC section 5.12 for additional information on regulations governing the transport of hazardous materials.

To address the issue of tanker truck safety, anhydrous ammonia will be delivered to the proposed facility in DOT-certified vehicles with design capacities of 6,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-3** to ensure that, regardless of which vendor supplies the anhydrous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The applicant estimated that routine operation of the proposed LEC would require about two ammonia deliveries per month with a maximum of 24 deliveries per year (LEC 2008a, Section 5.5.4.2.5). Each delivery will travel about 2.5 miles along local roads once leaving I-5 (if coming from north) or about 5.5 miles from I-5 (if coming from south).

This would result in a maximum of 60 or 132 miles of delivery tanker truck travel in the project area per year (with a full load), depending on the direction the vendor would arrive from. Staff believes that the risk over either of these distances is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000. The applicant also prepared a transportation risk analysis which calculated the annual risk of an incident occurring with 10 or more

fatalities and an incident occurring with 33 or more fatalities, which were found to be 1.26 in 1,000,000 and 0.20 in 1,000,000, respectively (LEC 2008a, Section 5.5.4.2.5).

In addition, staff used a transportation risk assessment model (developed by staff) in order to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility along the local roadways. Results show a risk of 0.27 in 1,000,000 for one trip from I-5 if coming from north and 0.82 in 1,000,000 for one trip from I-5 if coming from south. The total annual risk was calculated as 6.4 in 1,000,000 or 19.7 in 1,000,000 for 24 deliveries from the north or south, respectively. This risk was calculated using accident rates on various types of roads (in this case, rural multilane undivided and rural two-lane) with distances traveled on each type of road computed separately (1 mile on Eight Mile Rd, 3.5 or 1.5 miles on N Thornton, 0.2 miles on Frontage, and 0.8 miles on N Cord). Although it is an extremely conservative model in that it includes risk of accidental release from all modes of hazardous materials transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

Staff also uses a risk management goal for exposure to ammonia vapors from an accidental release during the transportation of ammonia. The potential for impacts on in-route populations near highways is highly dependent on the proximity of populations at the accident location and on other factors present at the time of the accident, such as wind direction and potential for atmospheric dispersion. The risk of impact (injury or fatality) to the populations along the transportation route would be at least one order of magnitude less than the risk of the release itself. Risk of impact, therefore, is the product of release probability and concurrent probability of worst case atmospheric dispersion conditions and presence of receptors in the area affected by hazardous concentrations. Staff has viewed risks with probabilities of less than 1 in 100,000 per year, for up to 10 potential fatalities, as insignificant. (This risk is also the same as 1×10^{-4} for one fatality per year, similar to the societal risk for accidental releases from stationary sources.) Staff therefore reviews the length of the route and the number of miles along the route that are in close proximity to proposed populated areas in determining if the risk is less than this level. For the LEC, staff has determined that the risk of an accidental release resulting in fatalities is less than significant.

In order to further ensure that the risk of an accident involving the transport of anhydrous ammonia to the power plant is insignificant, staff proposed Condition of Certification **HAZ-4** would require the use of only the specified and approved route to the site.

Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that anhydrous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and

pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Referring to the sections on **GEOLOGIC HAZARDS AND RESOURCES** and **FACILITY SAFETY DESIGN** in the AFC, staff notes that the proposed facility will be designed and constructed to the standards of the 2007 California Building Code for Seismic Zone 4 (LEC 2008a, Section 2.4.1.2).

Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002), the North American Electric Reliability Corporation published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain volumes of hazardous materials conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list and volumes of chemicals, on November 2, 2007. The list includes anhydrous ammonia and thus the existing STIG power plant along with the proposed LEC would fall under the jurisdiction of the CFATS.

The applicant has an existing security plan which was discussed during staff's June 4, 2009 site visit. Staff determined that the existing site security is adequate but that a written plan must be prepared for the proposed facility and include a description of perimeter security measures and procedures for evacuating, notifying authorities of a

security breach, monitoring fire alarms, conducting site personnel background checks, site access, and a security plan and background checks for hazardous materials drivers. Perimeter security measures utilized for this facility presently include security guards, security alarms, breach detectors, motion detectors, and video or camera systems (LEC 2008a, Section 5.5.4.2.6).

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for the LEC project is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of the consequences of that event. Since staff has determined that the existing level of security is adequate, staff does not propose that the applicant or project owner conduct its own vulnerability assessment.

The present and proposed additional security measures include perimeter fencing and breach detectors, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contacts in the event of a security breach. Site access for vendors shall be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.800) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as per 49 CFR Part 1572, Subparts A and B). The compliance project manager (CPM) may authorize modifications to these measures or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one

uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

Section 5.5.3 of the AFC provides a description of present and future projects in the City of Lodi and San Joaquin County (LEC 2008a). Since the STIG plant and the proposed LEC facility would share the anhydrous ammonia storage facility, no cumulative impacts can occur from these two projects. One existing project in the area stores and uses hazardous materials that may have a potential cumulative impact. None of the planned projects in the vicinity of the proposed LEC do so. The city of Lodi White Slough Water Pollution Control Facility stores, uses, and transports hazardous materials for water treatment. These chemicals include chlorine and sulfur dioxide gas. A release of either of these chemicals into the environment could pose a threat to human health and safety and both could add to or detract from a cumulative impact should a release occur simultaneously with a release of anhydrous ammonia from the STIG/LEC facility. Chlorine gas and ammonia gas neutralize each other and thus the cumulative impact would be reduced from that of an incremental impact due to the release of the individual chemicals. Ammonia and chlorine react to form chloramines which are far less toxic than the reactants. The same is true for the interaction of sulfur dioxide gas and ammonia gas. Studies show that they react to form ammonium sulfate as the main product, with sulfamic acid and ammonium sulfamate as the minor products. All three chemicals are far less toxic than the reactants ammonia and sulfur dioxide. Therefore, the risk of a cumulative impact being greater than in individual impact is less than significant.

The applicant will develop and implement a hazardous materials handling program for the LEC which would minimize the potential for an accidental release. Staff believes that the LEC, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the LEC project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

Staff’s evaluation of the proposed project with proposed mitigation measures indicates that hazardous material use, storage, and transportation will pose a less than significant

impact to the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant has already prepared an RMP and a PSMP for the existing STIG plant which were determined by staff to be adequate. Staff's proposed conditions of certification address the issue of the transportation, storage, and use of anhydrous ammonia, in addition to site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed, and operated to comply with all applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the applicant and staff are required and implemented, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff proposes six conditions of certification mentioned throughout the text (above), and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **APPENDIX B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager.

Staff believes that an accidental release of anhydrous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario and therefore proposes Condition of Certification (**HAZ-2**) requiring the development of a safety management plan for the delivery of all liquid hazardous materials, including anhydrous ammonia. The development of a safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-3** and **HAZ-4**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-5** and **HAZ-6.**

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

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

HAZ-2 The project owner shall develop and implement a Safety Management Plan for delivery of anhydrous ammonia and other liquid hazardous materials by tanker truck. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a

power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least thirty (30) days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-3 The project owner shall direct all vendors delivering anhydrous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-330 or 331.

Verification: At least thirty (30) days prior to LEC commissioning, 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-4 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (I-5 to North Thornton Road to Frontage Road to North Cord Road to the project site). The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least sixty (60) days prior to LEC commissioning, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-5 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;
2. Security guards;
3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;
5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. Evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-6 The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials

storage. The level of security to be implemented shall not be less than that which presently exists at the STIG site and shall include any additional measures not in existence as described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high;

2. Main entrance security gate, either hand operated or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

6. A. A statement (refer to sample, **ATTACHMENT A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

   B. A statement(s) (refer to sample, **ATTACHMENT B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

7. Site access controls for employees, contractors, vendors, and visitors;

8. A statement(s) (refer to sample, **ATTACHMENT C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the ammonia storage tank; and

10. Additional measures to ensure adequate perimeter security consisting of either:

    A. Security guard(s) present 24 hours per day, 7 days per week; **<u>or</u>**

    B. Power plant personnel on site 24 hours per day, 7 days per week, and **all** of the following:

        1) The CCTV monitoring system required in item 9, above, shall include cameras able to pan, tilt, and zoom; that have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the anhydrous ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **and**

        2) Perimeter breach detectors **<u>or</u>** on-site motion detectors.

    The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components— transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Corporation, after consultation with both appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least thirty (30) days prior to LEC commissioning, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS APPENDIX A

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (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 the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines 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. California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	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 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	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 minutes 30 minutes 10 minutes	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 hours	No toxicity or irritation on continuous exposure for repeated 8-hour 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 minutes	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) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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ABBREVIATIONS - HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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

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HAZARDOUS MATERIALS APPENDIX B
Hazardous Materials Proposed for Use at the LEC

Hazardous Materials Appendix B
Hazardous Materials Proposed for Use at the LEC

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetylene	47-86-2	Welding gas	Health: asphyxiant gas Physical: flammable	540 cubic feet	NA
Amine NALCO 5711	7664-41-7 141-43-5	Boiler feedwater pH control	Health: harmful if swallowed, causes irreversible eye damage Physical: non-flammable	400 gallons	100 pounds
Anhydrous Ammonia (99% NH3)	7664-41-7	Control oxides of nitrogen (N0x) emissions through selective catalytic reduction	Health: corrosive, irritation to permanent damage from inhalation, ingestion, and skin contact Physical: combustible, but difficult to burn	10,200 gallons	100 pounds
Antifoam NALCO 71-D5	64741-44-2 25322-69-4 Proprietary 8002-74-2 Proprietary	Cooling tower foam control	Health: causes irritation to skin and eyes Physical: slightly flammable	55 gallons	NA
Anti-scalant NALCO PC-191T	Various	Prevent scale in reverse osmosis membranes	Health: may cause slight irritation to the skin and moderate irritation to the eyes Physical: not flammable	400 gallons	NA
Anti-scalant NALCO PC-510Tc	None	Prevent scale in reverse osmosis membranes	Health: may cause irritation with prolonged contact Physical: slightly flammable	400 gallons	NA
Biocide NALCO 3980	26172-55-4 2682-20-4 10377-60-3	Injection well biological control	Health: corrosive, causes irreversible eye damage or skin burns, harmful if inhaled swallowed or absorbed through the skin Physical: non-flammable	55 gallons	NA
Biocide NALCO 73551	None	Cooling tower bio penitrant	Health: may cause irritation with prolonged contact Physical: slightly flammable	400 gallons	NA

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Biocide NALCO 7330	26172-55-4 2682-20-4 10377-60-3	Cooling water bio control	Health: corrosive, causes eye and skin burns, may cause severe respiratory tract irritation with possible burns, may cause severe digestive tract irritation with possible burns Physical: non-flammable	400 gallons	NA
Caustic NALCO 8735	1310-73-2 1310-58-3	Boiler makeup water pH control		25 gallons	1,000 pounds
Citric Acid	77-92-9	Non-chemical cleaning of HRSG interior piping	Health: causes irritation to the skin, gastrointestinal tract, and respiratory tract Physical: slightly flammable	5,000 gallons	NA
Cleaning Chemicals	Various	Cleaning	Health: refer to individual chemical labels Physical: refer to individual chemical labels	Varies (less than 25 gallons liquids or 100 pounds solids for each chemical)	NA
Cleaning Chemicals/ Detergents (Including PC 98, PC-11, and PC 56)	None	Periodic cleaning of combustion turbine	Health: refer to individual chemical labels Physical: refer to individual chemical labels	1,000 gallons	NA
Coagulant NALCO 8108	None	Cold lime softener turbidity removal	Health: may cause irritation with prolonged contact Physical: slightly flammable	800 gallons	NA
Corrosion Control NALCO 3DT-184	7664-38-2	Cooling water corrosion inhibitor	Health: corrosive, may cause irritation with prolonged contact, toxic to aquatic organisms Physical: non-flammable	1,000 gallons	5.000 pounds
Diesel No. 2c	68476-34-6	Small equipment refueling	Health: may be carcinogenic Physical: flammable	55 gallons	NA
Dispersant NALCO 3DT-191	None	Cooling water mineral dispersant	Health: may cause irritation with prolonged contact Physical: slightly flammable	1,000 gallons	NA

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
EPA Protocol Gases	Various	Calibration gases	Health: refer to individual chemical labels Physical: refer to individual chemical labels	1,000 cubic feet	NA
Flocculent NALCO 7768	None	Cold lime softener turbidity removal	Health: may cause irritation with prolonged contact, toxic to aquatic organisms Physical: slightly flammable	800 gallons	NA
Glutamine	56-85-9	Injection well biological control	Health: causes irritation to skin and eyes Physical: non-flammable	55 gallons	NA
Hydraulic Oil	None	High-pressure combustion turbine starting system, turbine control valve actuators	Health: hazardous if ingested Physical: combustible	700 gallons	42 gallons
Hydrogen	1333-74-0	Steam turbine generator cooling	Health: asphyxiation by displacement of oxygen Physical: flammable	20,000 cubic feet	NA
Laboratory Reagents	Various	Water/wastewater laboratory analysis	Health: refer to individual chemical labels Physical:	10 gallons	NA
Lime	1305-62-0	Cold lime softener hardness removal	Health: irritation of eyes, respiratory or red “sunburn like” skin Physical: non-flammable	2,000 pounds	NA
Lithium Bromide	7550-35-8	Chiller refrigerant	Health: hazardous if ingested, causes irritation to skin and eyes Physical: non-flammable	75 gallons	NA
Lubrication Oil	None	Lubricate rotating equipment (e.g., gas turbine and steam turbine bearings)	Health: hazardous if ingested Physical: flammable	1,500 gallons	42 gallons

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Magnesium Oxide	1309-48-4	Cold lime softener silica removal	Health: slowly absorbed, ingestion my cause rapid bowel evacuation, inhalation can cause a flu like illness (metal fume fever), this 24 to 48-hour illness is characterized by chills, fever, aching muscles, dryness in the mouth, and throat and headache Physical: non-flammable	2,000 pounds	NA
Mineral Insulating Oil	8012-95-1	Transformers/switchyard	Health: minor health hazard Physical: may be combustible, depending on manufacturer	3,500 gallons	42 gallons
NALCO BT300	1310-73-2 7758-29-4	Boiler water pH control	Health: corrosive, will cause eye burns and permanent tissue damage Physical: non-flammable	400 gallons	1,000 pounds
Oxygen	7782-44-7	Welding gas	Health: therapeutic overdoses can cause convulsions, liquid oxygen is an irritant to skin Physical: oxidizing agent, actively supports combustion	540 cubic feet	NA
Oxygen Scavenger (e.g., NALCO ELIMIN-OX)	None	Oxygen scavenger for boiler water conditioning	Health: may cause asthma like attack if ingested, can cause mild irritation, causes asthmatic signs and symptoms in hyper-reactive individuals Physical: non-flammable	400 gallons	NA
Paint	Various	Touchup of painted surfaces	Health: refer to individual container labels Physical: refer to individual container labels	Varies (less than 25 gallons liquids or 100 pounds solids for each type)	NA
Propane	74-98-6	Torch gas	Health: asphyxiant gas, causes frostbite to area of contact Physical: flammable	200 cubic feet	NA

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Sodium Bisulfite (NaHSO3) NALCO PC-7408	7664-41-7 141-43-5	Reduce oxidizers in reverse osmosis feed to protect the RO membranes	Health: corrosive, irritation to eyes, skin, and lungs, may be harmful if digested Physical: non-flammable	400 gallons	100 pounds
Sodium Hydroxide (NaOH)	1310-73-2	Convert CO2 to alkalinity for removal by reverse osmosis	Health: causes eye and skin burns, hygroscopic, may cause severe respiratory tract irritation with possible burns, may cause severe digestive tract irritation with possible burns Physical: non-flammable	10 gallons	1,000 pounds
Sodium Hypochlorite	7681-52-9	Cooling tower biological control	Health: harmful by ingestion, inhalation, and through skin contact Physical: non-flammable	1,500 gallons	100 pounds
Sodium Nitrite NALCO 2536 Plus	7632-00-0 6834-92-0 1330-43-4 7631-99-4 2492-26-4	Closed & chilled water loop corrosion inhibitor	Health: very hazardous in case of eye contact (irritant), of ingestion, of inhalation, hazardous in case of skin contact (irritant), slightly hazardous in case of skin contact (permeator), prolonged exposure may result in skin burns and ulcerations, over-exposure by inhalation may cause respiratory irritation, severe over-exposure can result in death, inflammation of the eye is characterized by redness, watering, and itching Physical: non-flammable	30 gallons	100 pounds
Sulfur Hexafluoride	2551-62-4	230 KV breaker insulation medium	Health: hazardous if inhaled Physical: non-flammable	200 pounds	NA
Sulfuric Acid (93%)	7664-93-9	Cooling tower pH control	Health: causes severe skin burns, causes sever eye burns, causes burns of the mouth throat, and stomach Physical: non-flammable	3,000 gallons	1,000 pounds

Source: LEC 2008a Tables 5.5-1, 5.5-2, & 5.5-3
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Testimony of Amanda Stennick

SUMMARY OF CONCLUSIONS

The proposed Lodi Energy Center project would not result in conversion of any farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The proposed project would not disrupt or divide the physical arrangement of an established community.

With the exception of the gas pipeline proposed in the Runway Protection and Inner Approach Zones and with the adoption of Conditions of Certification **LAND-1**, the proposed project would be in compliance with land use LORS. The proposed project would be compatible with existing on-site or nearby uses and the cumulative land use impacts would be less than significant. **LAND USE** and **TRAFFIC AND TRANSPORTATION** staff will continue to work with the applicant to resolve the issues with the San Joaquin County Council of Governments Airport Land Use Compatibility Plan (ALUCP).

INTRODUCTION

The land use analysis of the Lodi Energy Center (LEC) Application for Certification (AFC) focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant may also create a significant land use impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Land Use Table 1 provides a general description of land use LORS applicable to the proposed project. The project's consistency with these LORS is discussed in **Land Use Table 2**.

Land Use Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	None
State	
	California Land Conservation Act (Gov. Code § 51200-51297.4)
Local	
	City of Lodi General Plan and Title 17 Zoning San Joaquin County General Plan and Title 9 Zoning Conservation and Open-Space Plan; San Joaquin County Council of Governments Airport Land Use Compatibility Plan (ALUCP)

SETTING

The proposed 4.4-acre LEC project site is located on land owned and incorporated by the city of Lodi, six miles west of the city center. The power plant site is on the west side of Interstate 5 (I-5), less than two miles south of State Route 12 (SR 12). On the east side of the site is the city of Lodi's White Slough Water Pollution Control Facility (WPCF). The WPCF's treatment and holding ponds are located to the north, the existing Northern California Power Agency (NCPA) Combustion Turbine Project #2 (STIG plant) is located to the west with a 230-kV PG&E overhead electrical transmission line aligned further to the west, and the San Joaquin County Mosquito and Vector Control District facility is to the south.

The project site is currently undeveloped and is used for equipment storage during upgrades to the WPCF. Construction laydown and parking areas will be within existing site boundaries of the WPCF on city-owned property. Four parcels totaling 9.8 acres will be used for both construction and laydown areas. The STIG plant and the LEC plant would be adjacent to each other and would be owned and operated by NCPA. Therefore, some existing facilities will be shared between the two plants, while other facilities would require modification to allow for the LEC plant. The following existing elements of the STIG plant's infrastructure will be shared between the two facilities.

- The anhydrous ammonia system, including the 12,000-gallon storage tank and unloading facilities;
- The 230-kilovolt (kV) switchyard and interconnect;
- Fire water storage tanks and diesel-fired emergency fire pump;
- The domestic water systems; and

- The existing Class I underground injection well.

The administration building, including the control room, office space, maintenance shop, and warehouse facilities would be modified or built as part of the LEC project. The existing commercial cooling tower and gas metering station for the STIG plant would be relocated to accommodate the LEC plant, but would not be shared by both facilities. For a detailed description of the proposed project components and associated facilities, see the **PROJECT DESCRIPTION** section of this document. The project vicinity is developed primarily in agricultural and rural residences, I-5, local roadways, and irrigation canals. There are three residences located less than one mile north of the power plant site. Figure 5.6-1 in the AFC shows existing land uses within one mile of the project site.

GAS PIPELINE ALIGNMENT

As stated in the Supplement C-Natural Gas Supply Line Route Change (CH2MHILL 2009d), about 1.1 miles of the proposed 2.7-mile-long gas pipeline alignment have been rerouted from the original proposed location as described in the AFC. Most of the 1.1-mile-long realigned portion of the gas pipeline would be routed on unnamed dirt roads that separate agricultural fields; about 0.2 mile of the realigned route would be in the Thornton Road right-of-way. The realigned portion of the gas pipeline would be on lands designated Unique Farmland by the Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation and located on lands designated by the San Joaquin County General Plan as General Agriculture and zoned as General Agriculture. The realigned portion of the gas pipeline route would cross two parcels of land under Williamson Act contracts. The Assessor's Parcel Numbers (APNs) are 055-190-02 and 055-190-03. The Williamson Act contract numbers are 75-C1-71 and 74-C1-179, respectively.

The Kingdon Airport is located north of and adjacent to the proposed pipeline route. The majority of the realigned gas pipeline would be located beneath land designated as Horizontal Surface of the Kingdon Airport. Additionally, a small portion of the realigned pipeline would be located beneath land designated as Transitional Zone. Natural gas pipelines are an exempted and approved use in the Transitional Zone, according to Mike Swearingen at the San Joaquin Council of Governments (SJCOG), the Airport Land Use Commission for San Joaquin County (Swearingen, 2009). However, utility use is not allowed in the Runway Protection Zone, and natural gas and petroleum pipelines are prohibited uses within the Inner Approach Zone. Please refer to the **TRAFFIC AND TRANSPORTATION** section of this document for a thorough discussion of the project's airport-related impacts and proposed conditions of certification.

AGRICULTURAL LAND IN THE PROJECT AREA

The Farm Land Mapping and Monitoring Program (FMMP) of the California Department of Conservation (CDC) provides statistics on conversion of farmland to non-agricultural uses for San Joaquin County where the proposed LEC site is located. As stated in the AFC, the 2006 FMMP map shows the power plant site and four equipment and parking laydown areas are designated as "Urban and Built-Up Land." The natural gas pipeline route would cross land that is primarily designated as "Unique Farmland," with a small

portion of the alignment crossing land designated as “Urban and Built-Up Land” and “Farmland of Local Importance.” The definitions of these classifications are given below.

Urban and Built-up Land: Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.”

Unique Farmland: Land which does not meet the criteria for Prime Farmland or Farmland of Statewide Importance that has been used for the production of specific high economic value crops at some time during the two update cycles prior to the mapping date. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality and/or high yields of a specific crop when treated and managed according to current farming methods. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

Farmland of Local Importance: Land that is either currently producing crops, has the capability of production, or is used for the production of confined livestock. Farmland of Local Importance is land other than Prime Farmland, Farmland of Statewide Importance or Unique Farmland. This land may be important to the local economy due to its productivity or value. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. This land includes soils which qualify for Prime Farmland or Farmland of Statewide Importance, but generally are not cultivated or irrigated.

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

Figures 5.6-3R, -4R, and -5R in the Supplement C-Natural Gas Supply Line Route Change (CH2MHILL 2009d) illustrate the general plan land use designations, zoning, and airport land use zones of the proposed power plant site and associated linear facilities.

The power plant site, construction laydown areas, and a portion of the natural gas pipeline route are situated on land designated Public/Quasi-Public by the city of Lodi General Plan, and zoned Public and Community Facilities according to the city of Lodi Zoning (Title 17). The PF zoning district is applied to areas suitable for public land uses including government offices, schools, libraries, and other related public uses. Table 2-8 in Chapter 17.26 (Special Purpose Zoning Districts) of the Lodi Municipal Code Title 17 Zoning and Subdivision Ordinance shows that power plants and gas pipelines (Utility Facility) are allowable uses in the zoning designation. In addition, Utility Services are a permitted use on land that is zoned General Agriculture, according to San Joaquin County Zoning Title 9. Therefore, the project would not conflict with the city of Lodi or San Joaquin County General Plans and Zoning Ordinances.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources to determine consistency of the proposed project with applicable land use LORS and the proposed project's potential to create significant adverse land use-related impacts.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the proposed project results in:

- Conversion of Farmland
- Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, redevelopment plan, or zoning ordinance.
- Individual environmental effects, which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.
- A power plant and its related facilities may also be incompatible with existing or planned land uses if they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or preclude, interfere with, or unduly restrict existing or future uses. Please see other sections of this document for a detailed analysis of potential project impacts, recommended mitigation, and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

California Land Conservation Act (Gov. Code § 51200-51297.4)

The California Land Conservation Act, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. The landowner commits the parcel to an annually renewing ten-year period wherein no

conversion out of agricultural use is permitted. In return, the land is taxed at a rate based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. Participation in the Williamson Act program is dependent on county adoption and implementation of the program. Property owner participation in the program is voluntary. The proposed project's natural gas pipeline would cross two parcels that are under Williamson Act contracts. The affected parcels are APN 055-190-02 and 055-190-03.

PG&E will own and operate the natural gas pipeline. PG&E will construct the natural gas line adjacent to the existing gas pipeline servicing the STIG plant. Section 5.11.2.2 of the AFC states that the pipeline installation would not convert farmland to a non-agricultural use because the pipeline would be installed deep enough to allow future cultivation and the topsoil removed during excavation would be used to restore the land to its original condition before construction. For these reasons, the proposed project's gas pipeline will not impact those parcels under Williamson Act contracts.

Conversion of Farmland

The Farm Land Mapping and Monitoring Program (FMMP) shows that the proposed project site and four equipment and parking laydown areas are designated as "Urban and Built-Up Land". The natural gas pipeline route would cross land that is primarily designated as "Unique Farmland."

The FMMP designations for the proposed project site show that the LEC would not convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use. Section 5.11.2.2 of the AFC states that the pipeline installation would not convert farmland to a non-agricultural use because the pipeline would be installed deep enough to allow future cultivation and the topsoil removed during excavation would be used to restore the land to its condition before construction.

Therefore, the proposed project and associated linears would not convert any farmland to non-agricultural use and would not conflict with existing agricultural zoning. The project would have no impact to farmland conversion.

Physical Disruption or Division of an Existing Community

The proposed project would not physically divide any community within the city of Lodi or San Joaquin County. The project involves the construction and operation of a new power plant on undeveloped land owned by the city of Lodi, adjacent to its wastewater treatment plant and the existing NCPA STIG plant. The project would not involve the displacement of any existing development or result in new development that would physically divide an existing neighborhood.

Conflict with Any Applicable Habitat or Natural Community Conservation Plan

The **BIOLOGICAL RESOURCES** section provides a detailed discussion of LORS applicable to wildlife and plants, including the proposed project's consistency with the San Joaquin County Multi-Species Habitat Conservation and Open-Space Plan (Plan).

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design and operational components, and siting to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority (PRC 2005). As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code § 25523[d] [1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code § 25525). When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the affected local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with that agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance and to determine the views of the city of Lodi and San Joaquin County on the project's consistency with their general plans and zoning codes, staff sent letters to both agencies on November 21, 2008 requesting both agencies to provide the conditions for any Conditional Use Permit, Public Use Permit, and or variances that they would attach to the proposed project, were they the permitting agencies. In their 12/08/08 response letter, San Joaquin County stated that the gas pipelines would require a Site Approval, which would include notification to surrounding property owners and would be subject to CEQA review. They also stated that there are no standard conditions or ordinance requirements relative to underground pipelines other than complying with mitigation measures developed during the environmental review process. The city of Lodi has not responded. Because the license granted by the Energy Commission is in lieu of any permit issued by a local agency, staff will address the land use issues typically reviewed by the city of Lodi and San Joaquin County, were they the permitting agencies.

Because the Energy Commission issues a license in lieu of any state or local permit, it must make findings concerning whether the proposed modification conforms with state and local laws, ordinances, regulations and standards, including land use plans and zoning. **Land Use Table 2** provides the consistency of the proposed LEC project with the applicable land use LORS adopted by the city of Lodi and San Joaquin County, identified in **Land Use Table 1**. As discussed above, utility use is not allowed in the Runway Protection Zone, and natural gas and petroleum pipelines are prohibited uses within the Inner Approach Zone. Please refer to the **TRAFFIC AND TRANSPORTATION** section of this document for a thorough discussion of the project's airport-related impacts and proposed conditions of certification.

Staff has determined that with the exception of the gas pipeline proposed in the Runway Protection and Inner Approach Zones, the proposed project would comply with applicable land use LORS.

Land Use Table 2
Project Compliance with Adopted Applicable Land Use LORS

LORS	Goals/Objectives/Policy	Consistency Determination
City of Lodi General Plan Section 3 Land Use and Growth Management Element	Goal A. The City shall ensure the maintenance of ample buffers between incompatible land uses.	The power plant would be located on an existing industrial site and adjacent to the WPCF and the STIG Plant, which are compatible uses. As a result, it would not affect the existing buffers.
	Goal B: To preserve agricultural land surrounding Lodi and to discourage premature development of agricultural land with non-agricultural uses, while providing for urban needs.	The project would not affect the city's ability to preserve agricultural land surrounding the city.
City of Lodi General Plan Section 3 Land Use and Growth Management Element	1. The City shall encourage the preservation of agricultural land surrounding the City.	The project would not affect the city's ability to encourage and preserve agriculture surrounding the city.
	5. The City shall promote land use decisions within the designated urbanized area that allow and encourage the continuation of viable agricultural activity around the city.	The power plant has been sited adjacent to other existing industrial development (i.e. the STIG plant and the WPCF) to separate it from the nearby agricultural land uses, and the gas pipeline has been sited to minimize impacts to agricultural uses by following agricultural field boundaries to the extent possible.
	6. The City shall encourage San Joaquin County to retain agricultural uses on lands adjacent to the City.	The project would not affect the city's ability to encourage the county to retain agricultural uses on lands adjacent to the city.
	Goal C3. The City shall promote the development of clean industries that do not create problems or pose health risks associated with water and air pollution or potential leaks or spills.	Refer to the **WATER RESOURCES, AIR QUALITY**, and **HAZARDOUS MATERIALS** sections for discussions of the potential effects and measures to minimize those effects.

LORS	Goals/Objectives/Policy	Consistency Determination
	Goal H: To provide adequate land for development of public and quasi-public uses to support existing and new residential, commercial, and industrial land uses. 3. The City shall designate adequate appropriately located land for quasi-public uses such as hospital, churches, private school facilities, and utility uses.	The project would be consistent with this goal. The power plant would be sited on land that allows utility uses. In addition, the power plant would be located adjacent to other industrial, and compatible, land uses.
1991 City of Lodi General Plan land use designation:PQP Public/Quasi-Public	This designation provides for government-owned facilities, public and private schools, and quasi-public uses such as hospitals and churches.	The proposed LEC would be consistent with the City of Lodi General Plan.
Lodi Municipal Code Title 15 Buildings and Construction, Chapter 15.60 Flood Damage Prevention	City of Lodi General Plan (1991) states that the city shall only permit development in the 100-year floodplain consistent with Federal Emergency Management Agency (FEMA) regulations.	The project shall follow the City of Lodi requirements for construction within a special flood hazard zone, as stated in proposed Condition of Certification **LAND-1**. Adherence to the city's floodplain development requirements will render the project consistent with FEMA requirements.
Title 17 Zoning, Chapter 17.51 FP Floodplain District	This chapter establishes specific restrictions on the use of those properties or portions of properties which are situated within the city and within the Mokelumne River floodplain and in the special flood hazard areas as defined in this chapter. Special regulation is necessary for the protection of the public health, safety and general welfare, and of property and improvements both within and without the areas described in subsection A of this section from hazards and damage resulting from floodwaters and to promote the open space conservation element policies of the city's general plan.	The project shall follow the City of Lodi requirements for construction within a special flood hazard zone, as stated in proposed Condition of Certification **LAND-1**. Adherence to the city's floodplain development requirements will render the project consistent with FEMA requirements.
City of Lodi Municipal Code Title 17 Zoning and Subdivision Ordinance	Table 2-8 in Chapter 17.26 (Special Purpose Zoning Districts) of the Lodi Municipal Code Title 17 Zoning and Subdivision Ordinance shows that power plants and gas pipelines (Utility Facility) are allowable uses in the zoning designation.	The proposed LEC would be consistent with the city of Lodi zoning.

LORS	Goals/Objectives/Policy	Consistency Determination
San Joaquin County General Plan ***Chapter VI Resources*** **Agricultural Lands Objectives**	1. To protect agricultural lands needed for the continuation of commercial agricultural enterprises, small-scale farming operations, and the preservation of open space. 3. To minimize the impact on agriculture in the transition of agricultural areas to urban development.	The project would not affect the county's ability to protect agricultural lands from urban development. The project would not affect the county's ability to protect agricultural lands from urban development.
San Joaquin County General Plan ***Chapter VI Resources*** **Agricultural Policies**	5. Agricultural areas shall be used principally for crop production, ranching, and grazing. All agricultural support activities and non-farm uses shall be compatible with agricultural operations and shall satisfy the following criteria: (a) The use requires a location in an agricultural area because of unusual site area requirements, operational characteristics, resource orientation, or because it is providing a service to the surrounding agricultural area; (b) The operational characteristics of the use will not have a detrimental impact on the management or use of surrounding agricultural properties; (c) The use will be sited to minimize any disruption to the surrounding agricultural operations; and (d) The use will not significantly impact transportation facilities, increase air pollution, or increase fuel consumption.	The gas pipeline would be sited to allow for a connection to an existing gas pipeline. In addition, the gas pipeline would follow an existing gas pipeline route that is currently aligned with agricultural field boundaries to the extent possible. Operation of the power plant would not affect agricultural operations. Operation of the gas pipeline would not result in impacts to the agricultural parcels it would cross. Siting of the power plant would not affect agricultural operations. Construction of the gas pipeline would result in only temporary impacts to the agricultural parcels it would cross. The project would have no effect on transportation facilities. Refer to the Air Quality section for a discussion of project air emissions and measures to minimize potential air quality impacts.

LORS	Goals/Objectives/Policy	Consistency Determination
	8. To protect agricultural land, non-agricultural uses which are allowed in the agricultural areas should be clustered, and strip or scattered development should be prohibited. 10. Non-agricultural land uses at the edge of agricultural areas shall incorporate adequate buffers (e.g., fences and setbacks) to prevent conflicts with adjoining agricultural operations.	Siting the power plant adjacent to the existing wastewater treatment plant and mosquito and vector control district meets this requirement. The power plant site would be fenced, and would be adjacent to other industrial land uses.
San Joaquin Council of Governments Airport Land Use Commission (ALUC)	California state statutes require every county with an airport served by one or more commercial air carriers to have an Airport Land Use Commission (ALUC). For San Joaquin County, the San Joaquin Council of Governments (SJCOG) Board of Directors is the designated ALUC. State statutes require each County's ALUC to prepare an Airport Land Use Compatibility Plan (ALUCP). The ALUCP for San Joaquin County was prepared and adopted in 1983, was revised and updated in 1993, and is being updated as of January 2008. An ALUCP provides for the orderly growth of an airport including the area surrounding the airport referred to as the respective airport's "Area of Influence". Its primary function is to safeguard the general welfare of people residing within the vicinity of the airport and the public in general.	Because the proposed LEC site is within 20,000 feet of the Kingdon Airpark, an FAA Notice Criteria evaluation was performed for the 150-foot-tall exhaust stack. Based on the results of this evaluation, a FAA Form 7460-1, Notice of Proposed Construction or Alteration has been filed with the FAA. The evaluation demonstrates that the LEC does not pose a hazard to aircraft operations therefore its location in the conical zone is not inconsistent with the ALUCP. However, utility use is not allowed in the Runway Protection Zone, and natural gas and petroleum pipelines are prohibited uses within the Inner Approach Zone. Please refer to the **TRAFFIC AND TRANSPORTATION** section of this document for a discussion of the proposed gas pipeline's conformity with the Runway protection and Approach Zones.

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements and project reviews under CEQA are used to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses.

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located near a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, and nursing homes are considered to

be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, proximity is defined as “within 1000 feet” of a school (California Health & Safety Code §§42301.6–9) or within 0.25 miles of a sensitive receptor. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There are no schools, day-care facilities, hospitals, or nursing homes within one mile of the proposed site. Three residences are located approximately 0.75 miles north of the power plant site; a housing development along Eight Mile Road is located about two miles south of the site. Given the existing permitted uses surrounding the proposed project, and the fact that the proposed project and its associated facilities are consistent with local LORS (which are developed by local jurisdictions to mitigate impacts of planned development), the proposed project would not be considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

As stated in the **WATER RESOURCES** section of the AFC, the proposed LEC is located in the 100-year floodplain (Zone A) of the Federal Emergency Management Agency (FEMA) and the potential for a 100-year flood event to impact the site is medium to high. Please refer to the **WATER RESOURCES** section of this document for a thorough discussion of the potential for flooding of the project site, and compliance with federal, state, and local water LORS. Staff is also proposing Condition of Certification **LAND-1**, which would require the project owner to construct the project to the city of Lodi requirements for construction within a special flood hazard zone, as contained in the Lodi Municipal Code Title 15 Buildings and Construction, Chapter 15.60 Flood Damage Prevention and Title 17 Zoning, Chapter 17.51 FP Floodplain District.

The proposed project is situated on land designated Public/Quasi-Public by the city of Lodi General Plan, and is designated Public and Community Facilities according to the City of Lodi Zoning (Title 17). Because the project would be constructed and operated on undeveloped land owned by the city of Lodi and adjacent to its wastewater treatment plant and the existing NCPA STIG plant, development of the proposed project would be compatible with existing surrounding land uses. However, as discussed above, utility use is not allowed in the Runway Protection Zone, and natural gas and petroleum pipelines are prohibited uses within the Inner Approach Zone. Please refer to the **TRAFFIC AND TRANSPORTATION** section of this document for a thorough discussion of the project’s airport-related impacts and proposed conditions of certification.

Although from a land use perspective, the siting of the power plant at the proposed location is not incompatible with nearby residences, these residences may experience project-related nuisance impacts such as construction-generated noise, dust, and traffic and operation-related public health impacts. The **AIR QUALITY, HAZARDOUS MATERIALS MANAGEMENT, NOISE, PUBLIC HEALTH, TRAFFIC AND TRANSPORTATION,** and **VISUAL RESOURCES** sections provide detailed analyses of the noise, dust, public health hazards or nuisance, and adverse traffic or visual impacts on surrounding residential uses.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR 2006, §15065[A][3]).

The AFC states that in July 2008, there were 21 active projects in the city of Lodi. These projects are residential, office, mixed use, institutional, commercial, and industrial projects. All of these projects are more than four miles from the proposed LEC, except for the improvements at the White Slough WPCF (Draft EIR issued March 28, 2008), which is adjacent to the project site (LEC AFC, 2009b).

In July 2008, 72 projects were processed with the San Joaquin County Building Department. These projects are located in Acampo, Escalon, Farmington, French Camp, Linden, Lockeford, Manteca, Ripon, Stockton, and Tracy. The types of projects included new residential projects, additions, and remodels to existing residences, mobile home renovations, pool construction, administration buildings, barns, a riding arena, storage buildings, warehouses, office building conversions, and institutional projects such as classroom relocation and facilities to house animals (LEC AFC, 2009b).

Because the LEC is an allowable use at the proposed site and would not result in significant adverse land use impacts that cannot be mitigated, impacts from the LEC would not likely combine with those from the projects being processed within the city and county to result in significant cumulative impacts.

The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the growing population in the project area by connecting to existing electric system and other utility infrastructure. The land use effects of the proposed project in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, cumulative land use impacts would be less than significant.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The land use issues cited in San Joaquin County's November 8, 2008 letter to the Energy Commission are addressed by staff in the Staff Assessment (SA).

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in conversion of any Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project would not disrupt or divide the physical arrangement of an established community.

- With the exception of the gas pipeline proposed in the Runway Protection and Inner Approach Zones and with the adoption of Conditions of Certification **LAND-1**, the proposed project would be in compliance with local LORS.
- The proposed project would be compatible with existing on-site uses, as it is consistent with the general character of these permitted uses and development in the area.
- The proposed project's cumulative land use impacts would be less than significant.

PROPOSED CONDITION OF CERTIFICATION

LAND-1 The project owner shall design and construct the project to the applicable development standards in Sections 15.16.140 of the city of Lodi Municipal Code.

1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

2. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage using methods and practices that minimize flood damage.

3. All new construction and substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

4. New construction and substantial improvement of any structure shall have the lowest floor, including basement, elevated to or above the base flood elevation. Nonresidential structures may meet the standards in subdivision 2 of this subsection. Upon the completion of the structure the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, or verified by the community building inspector to be properly elevated. Such certification or verification shall be provided to the floodplain administrator.

5. Nonresidential construction shall either be elevated in conformance with subdivisions 1 or 2 of this subsection, or together with attendant utility and sanitary facilities: a. be flood proofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water; b. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and c. be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the

floodplain administrator. New nonresidential structures shall be flood proofed or elevated eighteen inches or more above the level of the base flood.

6. Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or meet or exceed the following minimum criteria: either a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves or other coverings or devices; provided, that they permit the automatic entry and exit of floodwaters; or are certified to comply with a local flood proofing standard approved by the Federal Insurance Administration.

Verification: At least sixty (60) days prior to the start of construction the project owner shall submit to the Compliance Project Manager (CPM) written documentation including evidence of review by the city of Lodi that the project conforms to the standards in Sections 15.16.140 of the City of Lodi Municipal Code.

REFERENCES

CEC 2009 a - Issues Identification Report, dated 01/06/09. Submitted to CEC Docket Unit on 01/07/09, tn 49621.

CEC 2009 b - Lodi Energy Center Project (08-AFC-10) Data Request Set 1 (#s 1-55), dated 01/07/09. Submitted to CEC Docket Unit on 01/07/09, tn 49639.

CEC 2009 c - Lodi Energy Center Project (08-AFC-10) Data Request Set 2 (#s 56-74), dated 2/04/09. Submitted to CEC Docket Unit on 02/04/09, tn 49974.

CEC 2008 d - Agency Letter to Rad Bartlam, Interim Director, city of Lodi Community Development Department Planning Division, dated 11/21/08. Submitted to CEC Docket Unit on 11/21/08, tn 49033.

NCPA 2008 a - Application For Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 b - Data Adequacy Response, Supplement B, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

NCPA 2008 c - Data Adequacy Supplement B, Attachment 5.15-1, LEC Construction Stormwater Pollution Control Plan, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

NCPA 2008 d - Appendix 5.6A, Current Development Projects for the city of Lodi and San Joaquin County, dated 09/10/08. Submitted to CEC Docket Unit on 9/10/08, tn 47973.

NCPA 2008 e - Appendix 5.14A, Final Phase I - Environmental Site Assessment, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 f - Data Request Set 1A, Responses to Data Requests #s1-55, Attachment DR38-1, and Interconnection Facilities Study, dated 02/05/09. Submitted to CEC Docket Unit on 02/05/09, tn 50006.

SJVAPCD a - Notice of Receipt of Complete Application Project (Number: N-1-83490), dated, 10/02/08. Submitted to CEC Docket Unit on 10/02/09, tn 48744.

SJCOG, Inc. a - SJMSCP Response to Lead Agency Advisory Agency Notice to SJCOG (tn 48738), Inc., dated 10/10/08. Submitted to CEC Docket Unit on 10/10/08, tn 48738.

NOISE AND VIBRATION

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Lodi Energy Center (LEC) can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct, indirect, or cumulative.

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 groundborne 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 LEC 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) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE APPENDIX A** immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
(OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State	
(Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local	
San Joaquin County Ordinance Code (Title 9 – Development Regulations §9-1025.9 Noise)	Establishes acceptable noise levels and limits hours of construction.
City of Lodi General Plan, Noise Element	Establishes acceptable noise levels.
City of Lodi Municipal Code, Noise Regulation (Title 9, Chapter 9.24)	Establishes acceptable incremental noise levels during nighttime hours.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). 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 only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of 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 groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[1] which correlates to a peak particle velocity of about 0.002 inches per second (in/sec).

[1] VdB is the common measure of vibration energy.

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 California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see the **WORKER SAFETY AND FIRE PROTECTION** section of this document, and **Noise Appendix A, Table A4**).

LOCAL

San Joaquin County Ordinance Code

Title 9 of the San Joaquin County Ordinance Code sets various performance standards; section 9-1025.5 addresses vibration, and section 9-1025.9 addresses noise (SJC 1995).

Section 9-1025.9(b)(2) requires new stationary noise sources to mitigate noise emissions so that noise levels at noise sensitive land uses do not exceed the noise level standards presented in Table 9-1025.9, Part II; this table is reproduced here as **Noise Table 2**:

Noise Table 2
Maximum Allowable Noise Exposure: Stationary Noise Sources

	Daytime (7 a.m. to 10 p.m.)	**Nighttime (10 p.m. to 7 a.m.)**
Hourly Equivalent Sound Level (L_{eq}), dB	50	45
Maximum Sound Level (L_{max}), dB	70	65

Source: SJC 1995, Table 9-1025.9, Part II

Section 9-1025.9(c)(3) exempts from these limits any construction noise, provided it does not take place before 6:00 a.m. or after 9:00 p.m.

City of Lodi General Plan Noise Element

The city of Lodi has established land use compatibility guidelines in its general plan noise element (city of Lodi 1991: Policy A-1). The noise levels considered generally acceptable and conditionally acceptable for residences are 60 dB L_{dn}/CNEL and 65 dB $_{Ldn}$/CNEL, respectively.

City of Lodi Municipal Code

Noise regulations applicable to the construction and operation of the project are set forth in the city of Lodi Municipal Code (city of Lodi 2008). Regulation Section 9.24.030 limits incremental noise level variation during nighttime hours; stating the following:

> (C) It is unlawful for any person, firm, or corporation to cause, permit, or generate any noise or sound as described herein between the hours of 10 p.m. and 7 a.m. which exceeds the ambient noise level at the property line of any residential property…as determined at the time of such reading by more than 5 dB.

SETTING

The LEC would be constructed on land adjacent to the city of Lodi's White Slough Water Pollution Control Facility located approximately six miles to the southwest of the Lodi city center and two miles north of the city of Stockton, in San Joaquin County. The project would be situated between White Slough and Interstate-5 (I-5). The land surrounding the project site is zoned for agricultural uses (NCPA 2008A, AFC §§ 1.1, 2.1, 5.6.1)

The ambient noise regime in the project vicinity consists primarily of highway traffic. The nearest sensitive noise receptor is a residence located approximately 4,250 feet north of the project site (NCPA 2008A, AFC § 5.7.2.2, Figure 5.7-1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. 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 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor.

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 considered 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 the case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. The resulting combined noise level;[2]
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:

- The construction activity is temporary;
- Use of heavy equipment and noisy activities are limited to daytime hours; and
- All industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

(NCPA 2008A, AFC § 5.7.2.2; Tables 7.5-3 through 7.5-6). The survey was conducted on July 7 through July 9, 2008, and monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1**:

1. Location M1: Near the closest residence to the project. This is a single-family residence located within San Joaquin County, approximately 4,250 feet north of the northern project boundary. I-5 runs between the project site and the residence. This location was monitored continuously from 6 p.m. on July 7 through 9 a.m. on July 9, 2008.

2. Location M2: Near a residence located approximately 5,500 feet north east of the project's eastern boundary, on the opposite side of I-5. This location was monitored continuously from 8 p.m. on July 7 through 9 a.m. on July 9, 2008.

3. Location M3: Near a residence located approximately 7,000 feet to the southeast of the eastern project boundary on the opposite side of I-5. This location was monitored continuously from 7 p.m. on July 7 through 8 a.m. on July 9, 2008.

4. Location M4: Near the residential development located approximately two miles south of the project. Measurements were taken at the golf course adjacent to the residential development, which stands between the project and the residences. This location was monitored continuously from 6 p.m. on July 7 through 9 a.m. on July 9, 2008.

Noise Table 3 summarizes the ambient noise measurements (NCPA 2008A, AFC Tables 5.7-3 through 5.7-6):

Noise Table 3
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime[1]	L_{eq} – Nighttime[2]	L_{90} – Nighttime[3]
M1: Nearest Residence	63	64	56
M2: Northeast Residence	54	53	44
M3: Southeast Residence	54	55	42
M4: Southern Residential Development	59	48	38

Source: NCPA 2008A, AFC Tables 5.7-3 through 5.7-6
1 Staff calculations of average of 15 daytime hours
2 Staff calculations of average of nine nighttime hours
3 Staff calculations of average of four consecutive quietest hours of the nighttime

DIRECT IMPACTS AND MITIGATION

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

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of The LEC is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities (NCPA 2008A, AFC § 5.7.3.2.1).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The Applicant has predicted the noise impacts of project construction on the nearest sensitive receptors (NCPA 2008A, AFC § 5.7.3.2.1, Table 5.7-8). A maximum construction noise level of 89 dBA L_{eq} is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity (most often the power block) and attenuate to no more than 50 dBA L_{eq} at the nearest sensitive receptor, location M1 (NCPA 2008A, AFC Table 5.7-8; and staff calculations). A comparison of construction noise estimates to measured ambient conditions is summarized in **Noise Table 4**.

Noise Table 4
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
Location M1 – Nearest Residence (north)	50	63 daytime	63 daytime	+0 daytime
		64 nighttime	64 nighttime	+0 nighttime
Location M2 – Residences to Northeast	48	54 daytime	55 daytime	+1 daytime
		53 nighttime	54 nighttime	+1 nighttime
Location M3 – Residence to Southeast	46	54 daytime	55 daytime	+1 daytime
		55 nighttime	56 nighttime	+1 nighttime
Location M4 – Residential Development to South	43	59 daytime	59 daytime	+0 daytime
		48 nighttime	49 nighttime	+1 nighttime

1 Source: NCPA 2008A, AFC Table 5.7-8; and staff calculations
2 Source: NCPA 2008A, AFC Tables 5.7-3 through 5.7-6; and staff calculations of average of daytime and nighttime hours

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

Noisy construction work would be allowed only during the daytime hours of 6:00 a.m. to 9:00 p.m. in compliance with the San Joaquin County LORS. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-8**. Therefore, the noise impacts of the LEC construction activities would comply with the noise LORS.

CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **Noise Table 4** above, last column, the highest increase in the ambient noise levels at the project's noise-sensitive receptors would be 1 dBA. An increase of 1 dBA would not be noticeable; therefore, the noise effects of plant construction are considered to be less than significant at the above receptors.

To ensure the project construction would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-8**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a notification process and a noise complaint process to resolve any complaints regarding construction noise.

In light of the following proposed conditions of certification, the noise impacts of the LEC construction activities would be less than significant.

Linear Facilities

New offsite linear facilities include a 2.5-mile-long natural gas pipeline. The applicant intends to utilize an existing water supply pipeline from the adjacent Water Pollution Control Facility and existing transmission lines connecting to an adjacent switchyard (NCPA 2008A, AFC §§ 2.1.7, 2.1.8, 2.1.10).

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-8**.

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. High pressure steam is then raised in a heat recovery steam generator (HRSG) or a boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow,

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

High pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 90 dBA at the nearest receptor, with consideration for distance and ground attenuation effects. This noise level could be annoying at this location, depending on the frequency, duration, and noise intensity of venting. With a temporary silencer installed on the steam blow piping, the above noise level can be attenuated by 20 to 30 dBA. Therefore, staff proposes Condition of Certification **NOISE-6** below, which would require the steam blow piping to be equipped with a temporary silencer. This condition would also require that steam blows be conducted only during the daytime hours.

Pile Driving

The applicant has discussed the possible use of pile driving during construction of the LEC (NCPA 2008A, AFC § 5.7.3.2.2, Table 5.7-9). If pile driving is required for construction of the project, the noise from this operation could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach levels of 65 dBA at location M1, the nearest residential receptor (NCPA 2008A, AFC Table 5.7-9). As shown in **Noise Table 5,** the greatest increase over ambient noise levels resulting from pile driving would occur at location M2 with an increase of 10 dBA. While this would produce a noticeable impact, staff believes that limiting pile driving to daytime hours, in conjunction with its temporary nature, would result in less than significant impacts at the project's noise-sensitive receptors. Staff proposes condition of certification **NOISE-8** to ensure that pile driving, should it occur, would be limited to daytime hours.

Noise Table 5
Pile Driving Noise Impacts

Receptor	Pile Driving Noise Level (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})	Cumulative Level (dBA)	Change (dBA)
M1	65	63	67	+4
M2	63	54	64	+10
M3	61	54	62	+8
M4	58	59	62	+3

Source: NCPA 2008A, AFC Table 5.7-9 and staff calculations

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, should it be employed. Vibration attenuates rapidly; it is likely

that no vibration would be perceptible at any appreciable distance from the project site. Staff therefore believes there would be no significant impacts from construction vibration at the project's noise-sensitive receptors.

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 (NCPA 2008A, AFC § 5.7.3.2.3). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of the LEC include combustion turbine generators, steam turbine generators, compressors, HRSGs, transformers, and a cooling tower (NCPA 2008A, AFC § 5.7.3.3.3, Table 5.7-11). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (NCPA 2008A, AFC § 5.7.3.3.3, Table 5.7-11). The applicant has predicted operational noise levels, summarized in **Noise Table 6** below.

Noise Table 6
Predicted Operational Noise Levels and Noise LORS

Receptor	Project Alone Operational Noise Level L_{eq} (dBA)[1]	City of Lodi General Plan, CNEL (dBA)	San Joaquin County Code, L_{eq} (dBA)[2]
M1	45	60	50 day/ 45 night
M2	45	60	50 day/ 45 night
M3	44	60	50 day/ 45 night
M4	42	60	50 day/ 45 night

Sources: [1] NCPA 2008a, AFC § 5.7.3.3.3
[2] Noise Table 1, above

The applicant has incorporated noise reduction measures into the design of the project to ensure that there will not be a substantial increase in noise levels at the nearest receptors. The local planning policy guidelines for San Joaquin County and the City of Lodi require new projects to meet the acceptable exterior noise level standards listed in **Noise Table 6**, in residential areas.

As seen in **Noise Table 6**, the project's operational noise level at the nearest receptors would be no more than 45 dBA L_{eq}. The CNEL scale is the average 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. It accounts for the higher sensitivity to noise in the nighttime, when people

are generally sleeping. For a constant noise source, such as a power plant, the hourly average level of 45 dBA is equivalent to 52 dBA CNEL. This is 8 decibels below the 60 dBA CNEL noise limit at locations M1 and M2 and would, correspondingly, be lower at M3 and M4. Therefore, the project's operational noise impacts at the nearest sensitive receptors (M1 through M4) would comply with both the city of Lodi and San Joaquin County's noise LORS. To ensure compliance, staff proposes Condition of Certification **NOISE-4**.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that make up most of the noise environment. Power plant noise therefore contributes to, and becomes a part of, background noise levels, or the sound heard when most intermittent noises stop. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff typically compares projected power plant noise to existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise levels to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors.

The applicant has predicted operational noise levels; they are summarized here in **Noise Table 7**.

Noise Table 7
Predicted Operational Noise Levels and CEQA

Receptor	Project Alone Operational Noise Level L_{eq} (dBA)[1]	Measured Existing Ambient, Average Nighttime L_{90} (dBA)[2]	Project Plus Ambient L_{90} (dBA)	Change in Ambient Level
M1	45	56	56	+0
M2	45	44	48	+4
M3	44	42	46	+4
M4	42	38	43	+5

1 Source: NCPA 2008A, AFC Table 5.7-11
2 Source: NCPA 2008A, AFC Tables 5.7-3 through 5.7-6; and staff calculations of average of four quietest consecutive nighttime hours

Combining the ambient noise level of 56 dBA L_{90} (**Noise Table 3**, above) with the project noise level of 45 dBA at M1 would result in 56 dBA L_{90}, the same as the ambient. Combining ambient noise levels with project noise levels at M2 and M3 results in an increase of 4 dBA above the ambient. As described above (in **METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE**), staff regards an increase of up to 5 dBA as a less-than-significant impact. Therefore, staff considers the above noise impacts at M1, M2 and M3 to be less than significant. To ensure these noise levels are not further exceeded, staff proposes Condition of Certification **NOISE-4**, below.

Combining the ambient noise level of 38 dBA L_{90} (**Noise Table 3**) with the project noise level of 42 dBA at M4 would result in 43 dBA L_{90}, 5 dBA above the ambient. While this is a noticeable increase, it lies within the range staff considers less than significant. Additionally, this increase would comply with the 5 dBA maximum noise level increase at sensitive receptors set forth in the city of Lodi Municipal Code. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4**, below.

Tonal Noises

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (NCPA 2008A, AFC § 5.7.3.3.4). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

All gas piping would lie underground and would 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 would thus be inaudible to any receptors (NCPA 2008A, AFC § 5.7.3.3.2).

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas turbines, steam turbines, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that ground-borne vibration from the LEC would 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 LEC's chief source of airborne vibration would be the gas turbines' exhaust. In a combined cycle power plant such as the LEC, however, the exhaust must pass through the HRSGs and the stack silencers

before it reaches the atmosphere. The HRSGs act as efficient mufflers. The combination of HRSGs and stack silencers makes it highly unlikely that the LEC would 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 (NCPA 2008a, AFC § 5.7.3.3.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

With implementation of the following conditions of certification, noise due to the operation of the LEC would not create significant adverse impacts.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, 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.

The applicant has identified twenty-one projects in the vicinity of the LEC. With the exception of the neighboring White Slough Water Pollution Control Facility (White Slough WPCF), all of these projects are more than four miles away from the LEC site; too far to cause cumulative impacts when combined with the LEC.

The plans to modify the White Slough WPCF include the addition of process equipment. However, given the relatively far distances to the LEC project receptors, cumulative impacts are not expected (NCPA 2008a, AFC § 5.7.4).

FACILITY CLOSURE

In the future, upon closure of The LEC, all operational noise from the project would cease, and no further adverse noise impacts from operation of The LEC 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, 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.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that The LEC, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, including the minority population, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within two miles of the site and one mile of 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 and include that telephone number in the above notice. 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 LEC, 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;
- Take all feasible measures to reduce the noise at its source if the noise is project related; 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 complaintant 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 CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. 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 and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the noise levels due to operation of the project alone will not exceed: an hourly average of 45 dBA, measured at or near monitoring locations M1 (approximately 4,250 feet north of the project site boundary) and M2 (approximately 5,500 feet northeast of the project site boundary); an hourly average of 44 dBA, measured at or near monitoring location M3 (approximately 7,000 feet southeast of the project site boundary); and an hourly average of 42 dBA, measured at or near monitoring location M4 (approximately 10,000 feet south of the project site boundary).

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 85% or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring location M4, or at a closer location acceptable to the CPM. This survey during the power plant's full-load operation shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

During the period of this survey, the project owner shall conduct a survey of noise at monitoring locations M1, M2, and M3, or at closer locations acceptable to the CPM. The short-term noise measurements at this location shall be conducted during the nighttime hours of 10:00 p.m. to 7:00 a.m.

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 affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceeds the above values, 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 85% or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, 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.

NOISE-5 Following the project's first achieving a sustained output of 85% 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 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.

STEAM BLOW RESTRICTIONS

NOISE-6 The project owner shall equip the steam blow piping with a temporary silencer. The project owner shall conduct steam blows only during the hours of 7:00 a.m. to 9:00 p.m.

Verification: At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and a description of the steam blow schedule.

NOISE-7 At least 15 days prior to the first steam blow(s), the project owner shall notify all residents or business owners within one miles of the site of the planned steam blow activity, and shall make the notification available to other area

residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below:

Any Day:	6:00 a.m. to 9:00 p.m.

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

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Lodi Energy Center
(08-AFC-10)

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 three feet from noise source _____dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at three 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

City of Lodi 2008 - City of Lodi Municipal Code. August 2008.

City of Lodi 1991 - City of Lodi General Plan Noise Element. 1991.

SJC 1995 - San Joaquin County Ordinance Code. 1995.

NCPA 2008 a - Application For Certification (AFC), Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

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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, those higher levels 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 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 (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** illustrates 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 1 dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-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 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **Noise Table A3** indicates the rules for decibel addition used in community noise prediction.

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 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

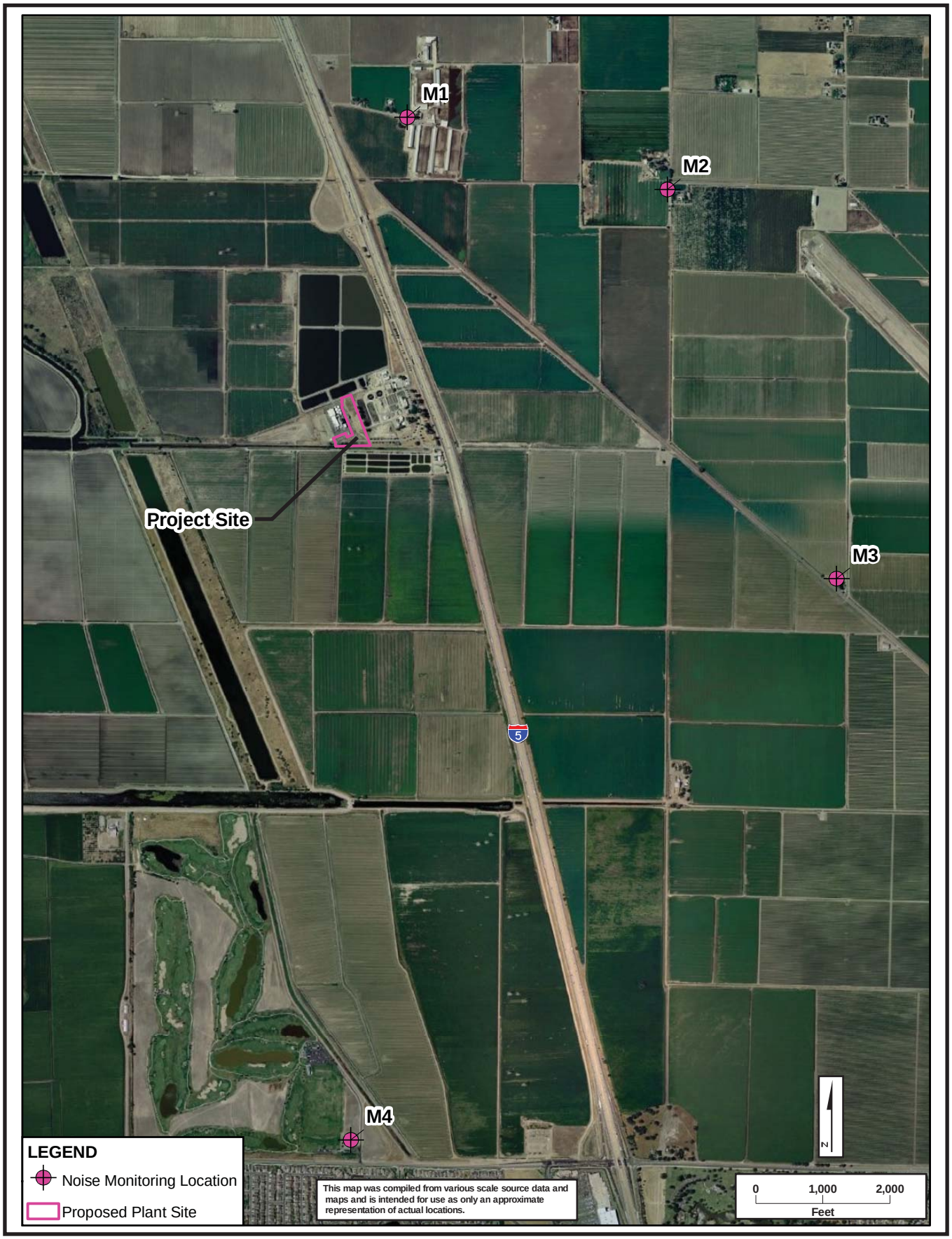
OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **Noise Table A4**.

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 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1
Lodi Energy Center - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 5.7-1

PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

SUMMARY AND CONCLUSIONS

Staff has analyzed the potential public health risks from the toxic air pollutants associated with construction and operation of the proposed Lodi Energy Center (LEC) and does not expect that there would be any significant adverse cancer or short- or long-term health effects. The toxic pollutants considered in this analysis are *noncriteria* pollutants, which are pollutants for which there are no established air quality standards. The potential for significant public health impacts from the other group of pollutants for which there are specific air quality standards i.e., *criteria* pollutants is discussed in the **AIR QUALITY** section with particular regard to those for which existing area levels exceed their respective air quality standards.

INTRODUCTION

The purpose of this **PUBLIC HEALTH** analysis is to determine if toxic emissions from the proposed Lodi Energy Center (LEC) would have the potential to cause significant adverse public health impacts or violate standards for public health protection in the project area. The sources of the toxic air pollutants of concern in this analysis are the project's combustion turbines and auxiliary boiler that would generate its electricity. These toxic pollutants are known as noncriteria pollutants and are pollutants for which there are no specific air quality standards. The other pollutants for which there are such air quality standards are known as criteria pollutants. If potentially significant health impacts are identified for the noncriteria pollutants considered in this analysis, staff would evaluate mitigation measures to reduce such impacts to less-than-significant levels.

Although the emission and exposure levels for criteria air pollutants are addressed in the **AIR QUALITY** section for informational purposes, staff has included **ATTACHMENT A** at the end of this **PUBLIC HEALTH** section to provide specific information on the nature of their respective health effects. The discussion in the **AIR QUALITY** section focuses mainly on the potential for exposure above the applicable standards and the regulatory measures necessary to mitigate such exposures with particular emphasis on carbon monoxide, ozone, and particulate matter for which existing area levels exceed their respective air quality standards.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code sections 39650 et seq.	These sections mandated the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also required that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.
Local	
San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 2201.	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of best Available Control Technology (BACT) and New Sources Review (NSR).

The impacts on public and worker health from accidental releases of hazardous materials are examined in the **HAZARDOUS MATERIALS MANAGEMENT** section while the health and safety impacts 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.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section describes staff's method of analyzing the potential health impacts of toxic pollutants together with the criteria used to determine their significance.

METHOD OF ANALYSIS

The toxic emissions addressed in this **PUBLIC HEALTH** section are those to which the public could be exposed during project construction and routine operation. If such toxic contaminants are released into the air or water, people may come in contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

The ambient air quality standards for the criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, are set to ensure the safety of everyone including those with heightened sensitivity to the effects of environmental pollution in general. Since noncriteria 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 safety standards based on known health effects.

For LEC and other sources, a screening-level risk assessment is initially performed using simplified assumptions intentionally biased toward protecting 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 would 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 would, 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) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

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

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. 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 (that is 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 exposed 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 risks 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 assesses the health effects of exposure to toxic emissions by first considering the impacts on the maximally exposed individual. This individual is the person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above. If the potential risk to this individual is below established levels of significance, staff would consider the potential risk as also less than significant anywhere else in the project area. As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer 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 Noncancer Health Effects

Staff assesses the significance of noncancer 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 of 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 relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance 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, were to exceed 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.

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, because of 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's 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, (NCPA 2008a, pp. 1-1, 3-1, 5.1-1, 5.1-2, 5.6-1, and Appendix 5.10A), the proposed project site is a 4.4-acre land parcel approximately 6 miles west of the Lodi city center in San Joaquin County, California. The site and the surrounding area are zoned for agricultural uses but for which power-generating facilities are allowed. The city of Lodi's White Slough Water Pollution Control Facility located on the east side while the existing NCPA Steam Turbine Injected Gas (STIG) plant (through whose switchyard LEC's power would be transmitted to the area power grid) is located to the west. The site is generally flat at nearly sea level and has three residences located approximately 0.75 miles to the north. There are no sensitive receptor locations within a one-mile radius. Sensitive receptor locations are those

housing sensitive individuals such as the elderly, school pupils and individuals with respiratory diseases who, as previously noted, are usually more sensitive to the effects of environmental pollutants than the general public. The applicant has provided a listing of the relatively few (churches, schools, child care and recreational centers) along with their respective distances of between 2.7 and 8.6 miles, respectively, from the site (NCPA 2008a, p. 5.6-2). 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 (as with the proposed project) with relatively few.

As discussed in the **SOCIOECONOMICS** section, there are specific locations in the vicinity of the proposed site with minority populations of more than 50%, pointing to environmental justice as a potential issue in assessing unavoidable exposures of area residents to the emissions from LEC operations. Sincere there are no locations where the low-income segments constitute more than 50% of the population, there would be no concern about disproportionate pollutant impacts on the basis of income.

The applicant discussed the available health studies identifying the project area and the broader San Joaquin Valley area as having asthma rates higher than the state's average. In San Joaquin County for example, the percentage of adults with asthma was reported to have increased from 12.1% in 2001 to 16.1% in 2005, mirroring the continuing increase in asthma cases in the U.S in general. The rates for children were slightly higher, at 16.4% for children for 2005. The cancer death rates in the county have remained relatively constant between 1999 and 2005, at slightly above the state's average of 180 per 100,000 population (NCPA 2008a, p. 5.9-4). This death-related health measure should be contrasted with the lifetime risk of contracting cancer as presently used in assessing the cancer risk from any given source of carcinogenic substances. As noted later, this average risk for an assumed 70-year lifetime is approximately 1in 3, or 330,000 in one million for the average American. The continuing challenge is to ensure that the unavoidable emissions from LEC and similar sources would be within levels not adding significantly to these background cancer and noncancer risks.

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 increase.

The proposed project site is in an area of hot summers, mild winters, and relatively low precipitation as it is separated from the rainier and cooler coastal regions by the coastal mountain ranges. This climate is strongly influenced by the large-scale warming and sinking of the air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's 17.6 inches of rainfall occurs. The yearly maximum summer temperature averages 89.7°F while the minimum averages 55°F (NCPA 2008a p.5.1-2). In winter, daily high and low temperatures are 56.6°F and 38.8°F respectively.

Because of the area's winds of low speeds (with little seasonal variation), the atmosphere has a limited capacity to disperse the area's air contaminants from the points of generation to other locations. Strong atmospheric temperature inversions frequently occur especially in the late mornings and early afternoons. These inversions severely limit vertical air mixing and result in the buildup of air pollutants by restricting their movement from the ground level to the upper atmosphere out of the air basin. Atmospheric stability is a measure of the turbulence that influences such pollutant dispersion. Mixing heights (the height above ground level below which the air is well mixed and in which pollutants can be effectively 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 as related to pollutant dispersion.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). By examining average toxic concentrations from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. The previously noted county cancer death rates could be assumed to reflect any contribution of pollutants from environmental sources to the overall cancer-related deaths. This cancer death rate should be contrasted with the total lifetime risk of developing cancer for the average individual. As previously noted, this average risk is estimated at about 1 in 3, or 330,000 in one million for a 70-year lifetime. While there are many well-established chemical and nonchemical inducers of human and nonhuman cancers, scientists have not reliably established environmental pollutants as significantly responsible for a large percentage of human cancers at normally encountered levels. The present regulatory approach is to minimize the unavoidable pollutant exposures from LEC and other sources to the extent considered insignificant using specific assessment methods.

Information on air quality and health risks in ARB's 2008 Almanac of Emissions and Air Quality for San Joaquin Valley Air Basin shows the average ambient levels of the top ten toxic air pollutants to have steadily decreased from 1999 through 2005 along with their related health risks. As examples, the pollutants, 1, 3-butadiene and benzene (emitted primarily from mobile sources), were reported to accounted for over 11.5% of the risk while diesel exhaust was reported to account for approximately 75% of the risk thus, justifying the present state focus on reducing diesel emissions from identifiable sources. Formaldehyde (which is emitted directly from vehicles and other combustion sources) accounted for 3% of the total. The uses of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to this decrease in ambient carcinogen levels. The potential risk from LEC and similar sources should best be assessed in the context of their potential addition to these related background risk levels.

The criteria pollutant-related air quality for the project area is assessed in the **AIR QUALITY** section by adding the existing levels (as measured at area monitoring stations), to the project-related levels, and comparing the resulting levels with the applicable air quality standards. Public health protection would be ensured only through

specific technical and administrative measures that ensure below-standard exposures when the project is operating. It is such a combination of measures that is addressed in the **AIR QUALITY** section.

POTENTIAL IMPACTS OF PROJECT'S NONCRITERIA POLLUTANTS

The health impacts of the noncriteria pollutants of specific concern in this analysis can be assessed separately as either construction-phase impacts or operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant, are from human exposure to the windblown dust from site excavation and grading and emissions from construction-related equipment (NCPA 2008a, pp.5.1-30, 5.9-11, and Appendix K). These dust-related impacts may result either from exposure to the dust itself as particulate matter 10 (PM10), or PM 2.5, or exposure to any toxic contaminants that might be adsorbed onto it. As more fully discussed in the **WASTE MANAGEMENT** section, the applicant's site contamination assessments identified a few locations of possible chemical contamination from past construction and agricultural activities (NCPA 2008a, pp. 5.14-1 and 5.14-2 and Appendix 5.14A). This means that particulate-related chemical exposures could occur during the site preparation and project erection phases. Specific conditions of certification are recommended in the **WASTE MANAGEMENT** section to ensure that any contaminated soil is handled and disposed of according to procedures that prevent such exposures.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by specific SJVAPCD Rules (NCPA 2008a, p. 5.1-30, 5.1-55, and 5.1-70). The only soil-related construction impacts of potential significance would be from the possible impacts of PM10 or PM 2.5 as a criteria pollutant during the 24-month construction period. As noted earlier, the potential for significant impacts from criteria pollutants is assessed in the **AIR QUALITY** section where the requirements for the identified mitigation measures are presented as specific conditions of certification.

The exhaust from diesel-fueled and other construction equipment has been established as a potent human carcinogen. Thus, construction-related emission levels could possibly add to the carcinogenic risk of specific concern in this analysis. The applicant has presented the diesel emissions from the different types of equipment to be used in the construction phase (NCPA 2008 Appendix 5.1E). Staff considers the recommended control measures (specified in the **AIR QUALITY** section Conditions of Certification **AQ-SC3**, and **AQ-SC4**) as adequate to minimize any cancer risk during the relatively short construction period.

Operational Impacts

The main health risk from LEC would be associated with emissions from its combustion turbines and auxiliary boiler that would generate its electricity. The quality of the project's process water as obtained from the adjacent White Slough Water Control Facility, (which also supplies the existing NCPA STIG plant) shows its intended use for cooling and other activities as not posing a toxics-related health hazard to humans

(NCPA 2008a, pp. 5.1-28, and 5.15-15 through 5.15-30). Staff's recommended condition of certification would minimize cooling tower-related microbial growth that could pose an infection hazard to humans. This is discussed below in the section on cooling tower operation and the risk of Legionnaires' disease.

Public Health Table 2 lists the project's toxic air pollutants of potential concern 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 would not be of concern but, if inhaled, may produce cancer and chronic (long-term) noncancer 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 differentiates the air toxics of concern in this analysis from the criteria pollutants is their tendency to be highest in close proximity to the source and decrease rapidly. 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 with existing assessment methods.

The applicant's estimates of the project'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 CAPCOA guidelines. The results from this assessment (summarized in staff's **Public Health Table 3**) were provided to staff along with documentation of the assumptions used (NCPA 2008a, pp.5.91 through 5.9-22 and Appendices-5.9A and 5-9B). 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.

Public Health Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1, 3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium			✔	✔	
Copper				✔	✔
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔	✔	✔	✔	
Mercury		✔		✔	✔
Naphthalene		✔		✔	
Nickel			✔	✔	✔
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: Prepared by California Energy Commission 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.

Staff finds these assumptions to be acceptable for use in this analysis and validates 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 as cancer risk for estimated levels of 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.

As shown in **Public Health Table 3**, the chronic hazard index for the maximally exposed individual is 0.008, while the maximum hazard index for acute effects is 0.05. These values are well below staff's significance criterion of 1.0, suggesting that the pollutants in question are unlikely to pose a significant risk of either chronic or acute noncancer health effects anywhere in the project area.

Public Health Table 3
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.05	1.0	No
Chronic Noncancer	0.008	1.0	No
Individual Cancer	0.043×10^{-6} (a)	10.0×10^{-6}	No

Source: California Energy Commission staff summary of information from NCPA 2008a pp. 5.9-17 and Appendix 5.1A.
(a) Risk from normal project operations

The cancer risk to the maximally exposed individual from normal project operation is 0.043 in 1,000,000, which is well below staff's significance criterion of 10 in 1,000,000 for this screening-level assessment. Thus, project-related cancer risk from routine operations would be less than significant for all individuals in the project area.

The conservatism in these assessments is further reflected in the noted 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 cooling tower 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 LEC's cooling tower using the same recycled water from the adjacent White Slough Water Pollution Control Facility currently used in the existing NCPA STIG plant. 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 less-than-significant levels.

Since staff has established that no significant health impacts would result anywhere in the project area from exposure to the toxic emissions considered in this analysis, the issue of environmental justice would not arise regarding the previously noted area with majority minority residents.

CUMULATIVE IMPACTS

The applicant conducted a health risk assessment to evaluate the potential combined impacts of the emissions from the proposed project, any reasonably foreseeable project, and existing area projects contributing to exciting background levels. Since there presently are no well identified future projects for the area, the cumulative impact assessment was made for the emissions from LEC and the existing NCPA Lodi STIG plant. As with the project itself, these combined impacts were expressed in terms of the potential cumulative cancer and noncancer risks in the operational phase (NCPA 2008a, pp. 5.9-20 and 5.9-21 and Appendix 5.1G). The present approach to regulating this group of pollutants is, as previously noted, to ensure that further unavoidable additions from identifiable sources would be maintained within insignificant levels.

The cumulative incremental area cancer risk at the point of maximum impact was calculated as 4.1 in 1,000,000. As with the project's emissions, this risk estimate is well

below staff's significance criterion of 10 in 1,000,000, meaning that the existing and proposed sources would not contribute significantly to the previously noted average area lifetime individual cancer risk of 330,000 in 1,000,000. The chronic and acute indices were calculated as 0.01 and 0.05 respectively, which staff regards as reflecting an insignificant addition to the area's noncancer health risks. The cumulative impacts from emission of the criteria pollutants are addressed in the **AIR QUALITY** section.

COMPLIANCE WITH LORS

The potential toxic pollutant-related cancer and noncancer risks from LEC operation reflect the effectiveness of control measures (including use of natural gas as fuel and an oxidation catalyst which reduces hazardous air pollutant emissions) proposed by the applicant. Since these risk estimates are far below the significance levels in the applicable LORS, staff concludes that the related operational plan would comply with these LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments on the public health aspects of this proposed project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of this proposed natural gas-burning LEC would be at levels that would not require mitigation beyond the specific emission control measures noted above. Since the potential impacts would be at insignificant levels, there would be no environmental justice issues when the project is operating. Staff therefore, recommends approval with respect to the toxic pollutants considered in this analysis but also recommends the following condition of certification to minimize microbial growth in the cooling tower. The conditions for ensuring compliance with applicable air quality standards are specified in the **AIR QUALITY** section for the area's criteria pollutants.

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 and kept to a minimum. This 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 Compliance Project Manager for review and approval.

REFERENCES

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

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ATTACHMENT A - CRITERIA POLLUTANTS

OZONE

Ozone (O_3) is not directly emitted from specific sources but is formed when reactive organic compounds 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. Environmental Protection Agency (EPA) revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had become 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 eight-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 exposure include increased airway responsiveness (which predisposes the individual to bronchioconstriction 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, data from controlled human exposure in clinical settings have indicated that the population at greatest risk of acute effects from ozone exposure is 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

Carbon monoxide (CO) 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, and the elderly, newborn infants, and fetuses (ARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (ARB 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 (ARB 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

Particulate matter (PM) 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. Particulate matter 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 travel only 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, often allowing such particles to exist for long periods of time (from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. Fine mode particles 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 its 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 clearance 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, without much effort, into the bodily circulation 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 its 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 particulate matter 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 particulate matter-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 (ARB 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, and 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 (ARB 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 (ARB 2002). The new standards took effect on July 5, 2003. The 24-hour PM10 standard was not changed. The standards were established to prevent an excess number of deaths; 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

Nitrogen dioxide (NO_2) 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 (ARB 1992, Appendix A, p. 4).

Sublethal exposures in animals usually produce inflammations and varying degrees of tissue injury characteristic of oxidant damage (Evans in ARB 1992, Appendix A, and p. 5). The changes produced by low-level acute or subchronic 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 (ARB 1992, Appendix A, p. 5).

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (ARB 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 (ARB 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 (ARB 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 (ARB 1992a, p. 108).

SULFUR DIOXIDE

Sulfur dioxide (SO_2**)** 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 *mucociliary 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 (ARB 1994, p. V-1).

The primary short-term effect is bronchioconstriction, a narrowing of the airways, which results in labored breathing, wheezing, and coughing. The short-term (one-hour) standard is based on bronchioconstriction and associated symptoms (such as wheezing and shortness of breath) in asthmatics and is designed to protect against adverse effects from 5- to 10-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 (ARB 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 (ARB 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 (ARB 1991a, p. 12).

ATTACHMENT A - REFERENCES

ARB. 1982. California Air Resources Board. California Ambient Air Quality Standard for Particulate Matter (PM10). December 1982.

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SOCIOECONOMICS

Testimony of Scott Debauche

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff concludes that the combined-cycle nominal 225-megawatt (MW) power generating facility, referred to as the Lodi Energy Center (LEC or proposed project), would not result in significant adverse direct or indirect socioeconomics impacts. In addition, the LEC would not contribute to a cumulative socioeconomic impact on the area's population, employment, housing, police, schools, or hospitals because the construction and operation workforce required for the LEC largely resides in the regional or local labor market area. The construction and operation of the proposed LEC would not result in any disproportionate adverse socioeconomic impacts to any low-income or minority population. Gross public benefits from the proposed LEC include capital costs and sales taxes as well as the generation of secondary jobs and income.

INTRODUCTION

The socioeconomics impact analysis evaluates project-related changes on existing population and employment patterns, and community services. In addition, this section provides demographic information related to environmental justice. A discussion of the estimated beneficial economic impacts of the construction and operation of the proposed LEC and other related socioeconomic impacts are provided.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed LEC project.

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State	
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.
Local	**None**

SETTING

The LEC would be located on land owned and incorporated by the city of Lodi, San Joaquin County, California, on a 4.4-acre parcel adjacent to the city of Lodi's White Slough Water Pollution Control Facility (WPCF) and the existing Northern California Power Agency (NCPA) Combustion Turbine Project STIG (STIG Plant). San Joaquin County is a county located in Central Valley of the state of California, just east of the San Francisco Bay Area. The LEC site is currently used as equipment storage for the WPCF. Land adjacent to the site to the east and northeast are open space lands. Adjacent land to the south and west are developed primarily into agricultural land uses with rural residences, Interstate 5 (I-5) and local roadways, and irrigation canals. There are three residences located approximately 0.75 mile to the north of the power plant site; these are the closest residences.

DEMOGRAPHIC SCREENING

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is conducted based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (*National Council on Environmental Quality, 1998). The screening process relies on Year 2000 U.S. Census data to determine levels of minority and below-poverty-level populations.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is (1) greater than 50%; (2) meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis; or (3) when one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50%.

For the LEC, the total population within a six-mile radius of the proposed site is 77,305 persons, and the total minority population is 33,496 persons or 43.3% of the total population (see **Socioeconomics Figure 1**). While the demographic screening area as a whole does not exceed 50.0%, as shown in **Socioeconomics Figure 1,** several Census Blocks within the six-mile radius of the proposed site contain a minority population greater than 50%. Therefore, staff in several technical areas identified in the Executive Summary has considered environmental justice in their environmental impact analyses.

Below-Poverty-Level Populations

Staff has also identified the current below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. The total population within a six-mile radius of the proposed site evaluated for low-income populations is 79,197 persons, and the total low-income population is 10,216 persons or 12.9% of the total population.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff uses Appendix G (Environmental Checklist Form) of the California Environmental Quality Act (CEQA) Guidelines to determine whether project-related socioeconomic impacts would be significant (see **Socioeconomics Table 2**). As required by the guidelines, staff determines a project's potentially significant impact on population, housing, recreation, and emergency medical and public services by evaluating the impact of the project on those areas.

Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **RELIABILITY, WORKER SAFETY AND FIRE PROTECTION,** and **SOILS AND WATER RESOURCES** sections of this document. Impacts on housing, parks and recreation, schools, medical services, law enforcement, and cumulative impacts are based on subjective judgments and input from local and state agencies. Typically, long-term employment of people from regions outside the study area could potentially result in significant adverse socioeconomic impacts.

Socioeconomics Table 2
CEQA Environmental Checklist Form

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING —Would the project:				
A. Induce substantial population growth in a new area, either directly or indirectly.				X
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
D. Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new of physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times, or other performance objectives for any of the public services:				
- Emergency medical services			X	
- Police protection				X
- Schools				X
- Parks				X
RECREATION—Would the project:				
A. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

To characterize the existing and projected future population profile of the study area, staff summarized the current and forecasted population trends for the study area in

Socioeconomics Table 3. As shown in **Table 3**, between the period of 2008 and 2030, San Joaquin County is expected to grow in excess of 500,000 persons. Currently, the cities of Lodi and Stockton account for approximately 52% of the San Joaquin County Year 2008 total population.

Socioeconomics Table 3
Population Profile of the Study Area, Year 2008–2030

	Year			
Area	**2008 Population**	**2010 Projected Population**	**2020 Projected Population**	**2030 Projected Population**
City of Lodi	63,360	N/A	N/A	N/A
City of Stockton	289,900	N/A	N/A	N/A
San Joaquin County	685,660	747,150	989,460	1,229,760

Source: NCPA 2008a, California Department of Finance (DOF) 2008a.
N/A: Data Not Available

For the purpose of this analysis, staff defines "induce substantial population growth" as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines "local workforce" for the LEC project to be the Stockton Metropolitan Statistical Area (MSA), which includes all of San Joaquin County.[1]

As stated in the Application for Certification (AFC) Section 2.0 (Project Description), the applicant expects that construction of the proposed LEC would last for 24 months. There would be an average of approximately 168 daily construction workers, with a peak daily workforce of 305 during month 16 of construction (NCPA 2008a, pp. 5.10-13 and 5.10-14). This peak employment number is used to analyze worst-case construction population and employment impacts. **Socioeconomics Table 4** shows Year 2006-2016 occupational employment projections for the Stockton MSA (San Joaquin County) by construction labor skill as compared to the estimated number of total construction workers by craft needed during the peak month (month 16) as presented in the AFC (NCPA 2008a, p 5.10-14).

[1] Metropolitan Statistical Areas are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal and State statistical agencies in collecting, tabulating, and publishing socioeconomic statistics.

Socioeconomics Table 4
Total Labor by Skill in Stockton MSA (2006 and 2016 Estimate)
And LEC Required Construction by Craft

Trade	Stockton MSA 2006	Stockton MSA 2016	Total # of Workers for Project Construction by Craft – Peak Month
Boilermaker	13,010[1]	13,540[1]	40
Carpenter	2,080	2,140	17
Cement Masons	550	580	3
Electricians	1,260	1,290	41
Ironworkers	340	350	24
Laborers	2,920	3,230	27
Millwrights	80	80	18
Operators	57	600	18
Painters	810	840	28
Pipefitter	950	980	54
Contractor Staff	13,010[1]	13,540[1]	31
Transmission Line	N/A	N/A	3

Source: EDD 2009.

[1] The "Construction Trades Workers" category was used, of which both "contractor staff" and "boilermakers" are considered a part of. These numbers overstate the actual number of both contractor staff and boilermakers, but were the only number available, as both the "Contractor Staff" and "Boilermaker" categories were not broken out for the EDD Stockton MSA labor force projections Construction and Extractions Occupation data sets.

N/A – Not enough information is available to determine "Transmission Line" labor classification.

Socioeconomics Table 4 shows the availability of skilled construction labor Stockton MSA for the LEC. As shown in **Table 4**, there is more than adequate local availability of construction workforce for the LEC. As such, the proposed project would not induce substantial growth or concentration of population in the project area and construction of the LEC would not encourage people to permanently relocate to the area. Therefore, construction of the LEC would have no direct or indirect impact on population growth in a new area.

On p. 5.10-13 of the AFC, the applicant states that the available workforce in the Stockton MSA would be adequate to fulfill LEC's construction labor requirements (NCPA 2008a). On p. 5.10-15 of the AFC, the applicant states that 60% of the construction workforce would come from within San Joaquin County, with the remaining workforce to be drawn from other nearby counties especially those in the San Francisco Bay Area or from out of state (NCPA 2008a,). Staff's independent analysis, which shows that there is more than an adequate local workforce for project construction is based on information contained in **Socioeconomics Tables 3 and 4**. Even if some of the construction workforce is drawn from surrounding counties, travel distance is well within the standard two-hour construction workforce commute. Therefore, staff concludes that construction of the LEC would have no direct or indirect impact on population growth in the area.

The proposed LEC is expected to require a total of five to seven permanent full-time employees (NCPA 2008a, p. 5.10-18). Due to the large labor force located within the Stockton MSA, it is assumed that the new employees required for the LEC would be found locally. Therefore, staff concludes that operation of the LEC would have no direct or indirect impact on population growth in the area.

Displace Existing Housing

The proposed LEC site is on land designated by the city of Lodi as Public/Quasi-Public (NCPA 2008a, p. 5.6-9). No housing structures exist on the property. As such, no housing would be displaced. As discussed above, the required construction and operational workforce of the LEC would be found locally and no inmigration would occur that would trigger the need for new housing. Therefore, staff concludes that no significant construction or operation-related impacts are expected for local housing supply availability or demand, and the LEC would not displace existing housing or necessitate construction of replacement housing elsewhere.

Displace Substantial Numbers of People

The proposed LEC site is on land designated by the city of Lodi as Public/Quasi-Public (NCPA 2008a, p. 5.6-9). No housing structures exist on the property. As such, no persons would be displaced.

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the LEC would not cause significant impacts to service ratios, response times, or other performance objectives relating to emergency medical services, law enforcement, or schools. Fire protection is analyzed in the **WORKER SAFETY AND FIRE PROTECTION** section of this document.

Emergency Medical Services

The nearest hospital with an emergency room (ER) is Lodi Memorial Hospital (LMH) in Lodi, which is approximately eight miles from the LEC project site. The Lodi Memorial Hospital, located at 975 Fairmont Avenue, is a not-for-profit acute care hospital that is owned by Lodi Memorial Hospital Association. It has 180 beds, about 20 physicians, and 1,100 full and part-time staff (NCPA 2008a, p. 5.10-12). Specialty services at the hospital include 24-hour emergency, maternity, intensive care, acute-physical rehabilitation, and surgical and medical care (NCPA 2008a, p. 5.10-12). Hospitals with trauma centers are San Joaquin General Hospital in Stockton and UC Davis Medical Center in Sacramento. LMH has a helipad to transport patients to both of these facilities (NCPA 2008a, p. 5.10-12).

There would be an average of approximately 168 daily construction workers, with a peak daily workforce of 305 during month 16 of construction (NCPA 2008a, pp. 5.10-13 and 5.10-14). Operation of the proposed LEC is expected to employ a total of five to seven full-time employees who are expected to maintain their existing residences within the study area labor force. In the event a worker or employee requires emergency medical care at the LEC site, LMH confirmed that LMH is a primary medical facility and has an emergency room, but is not a trauma center for industrial accidents (NCPA 2008a, Appendix 5.10, p. 3). Any major trauma would be sent to San Joaquin General

Hospital in Stockton or UC Davis Medical Center in Sacramento (NCPA 2008b, Appendix 5.10, p. 3). LMH does have a helipad to transport patients to both of these facilities (NCPA 2008b, Appendix 5.10, p. 3). Based on the available hospital facilities serving the LEC and the minimal long-term demands of the LEC on the hospitals serving the study area, the LEC would not significantly impact the existing service levels or response times of the hospitals serving the study area.

Law Enforcement

The proposed LEC site is located within the San Joaquin County Sheriff's Office (SJSO) jurisdiction. The SJSO has one station, the headquarters, located at 7000 Michael Canlis Boulevard, in the city of French Camp, CA. The LEC site is approximately 22 miles from the headquarters. The SJSO headquarters consists of approximately 350 sworn officers. The SJSO's average response time to a call from the LEC site would be about 20 minutes (NCPA 2008a, Page 5.10-11). The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. The CHP division covering highways within the LEC project area is the Valley Division Stockton Station located at 3330 North Ad Art Road in the city of Stockton, CA (CHP 2008). The CHP Valley Division has 785 uniformed officers (CHP 2008). Services include law enforcement, traffic control, accident investigation, and the management of hazardous material spill incidents.

As discussed above, the required construction and operational workforce of the LEC would be found locally. There would be no population inmigration occurring that would increase the local population or would require the need for new or expanded law enforcement facilities or staff levels. Therefore, no impacts to law enforcement providers within the LEC study area would occur from LEC construction or operation.

Education

There are a total of 17 elementary, high school, and unified school districts in San Joaquin County. The LEC site is located in the Lodi Unified School District (LUSD). The LUSD contained a total of 31,611 students, with 22,026 K-8th grade and 9,585 9-12th grade students, during the 2007-2008 school year (NCPA 2008a, pp. 5.10-10 and 5.10-11).

The schools in the LUSD are operating at or near capacity (NCPA 2008a, Appendix 5.10, p. 2). However, LUSD has indicated that there are long-range plans in place to deal with these over capacity issues, with current actions accommodating student demand through the use of portable classrooms (NCPA 2008a, Appendix 5.10, p. 2). As discussed above, the required construction and operational workforce of the LEC would be found locally. No population inmigration would occur that could increase the local population, and there would be no need for new or expanded school facilities or staff levels.

Education Code section 17620 authorizes a school district to levy a fee against any construction within a district. State and local agencies are precluded from imposing additional fees or required payments on development projects for the purpose of mitigating possible enrollment impacts to schools. Therefore, the LUSD may charge a one-time assessment fee $0.47 per square foot to mitigate potential school impacts

(NCPA 2008a, Appendix 5.10, p. 2). Based on 5,000 square feet of occupied structures, the LEC would pay a one-time $2,350 school impact fee for the proposed project (NCPA 2008a, p. 5.10-20). Therefore, the LEC would be in compliance with Education Code section 17620 through payment of a one-time school impact fee that would help reduce any potential impacts to school facilities to a less than significant level and ensure compliance with Education Code 17620 (as described in **Socioeconomics Table 1)**.

Increase the Use of Existing Recreation Facilities

The nearest park facility to the LEC is the Oak Grove Regional Park, located approximately 2.7 miles southwest of the site at 4520 West Eight Mile Road in the city of Stockton, CA (NCPA 2008a, p. 5.6-2). The second nearest park is Seafarers Park, located approximately 3.4 miles southwest of the site at 10002 River Bluff Lane in the city of Stockton, CA (NCPA 2008a, p. 5.6-2).

The demand for new or expanded park and recreational facilities is generally associated with an increase in housing or population. As discussed above, the required construction and operational workforce of the LEC would be found locally, with no population inmigration occurring. There would be no increase in the local population requiring the need for new or expanded recreational facilities. Therefore, construction and operation of the LEC would not have a significant adverse socioeconomic impact on parks and recreational facilities.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in significant adverse cumulative impacts when its effects are “cumulatively considerable.” Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, or the effects of probable future projects (Title 14, California Code of Regulations, section 15130). Cumulative socioeconomics impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by the local labor force, resulting in an influx of non-local workers and their dependents. Operational cumulative socioeconomic impacts could occur when the development of multiple projects significantly impacts the population of an area thus resulting in a housing shortage, change in local employment conditions, and an increased demand on public services.

A total of 21 projects located within the city of Lodi could have an adverse cumulative socioeconomic effect (NCPA 2008a, p. 5.6-25). Most of these projects are in areas zoned residential, with a few zoned office, mixed-use, institutional, commercial, and industrial projects. All of these projects are more than four miles from the LEC site, except for the improvements at the White Slough WPCF, which is adjacent to the project site (NCPA 2008a, p. 5.6-25). A total of 72 projects located within San Joaquin County could have an adverse cumulative socioeconomic effect (NCPA 2008a, p. 5.6-26). These projects are located in Acampo, Escalon, Farmington, French Camp, Linden, Lodi, Lockeford, Manteca, Ripon, Stockton, and Tracy. Project types include residential projects such as new residences, additions and remodels to existing residences, mobile home renovations, and pool construction; commercial projects such as administration

buildings, barns, and a riding arena; light industrial projects such as storage buildings, spray booths, and warehouses; office projects such as building conversions and tenant improvements; and institutional projects such as classroom relocation and facilities to house animals (NCPA 2008a, p. 5.6-26).

Socioeconomics Table 4 presents the most recently published data (Year 2006-2016 projections) on labor force characteristics for the Stockton MSA, which includes San Joaquin County. As discussed above, the required construction and operational workforce of the LEC would be found locally, with no population inmigration that would increase the local population. Therefore, because the proposed LEC would be adequately served by the local labor force, it would not contribute to cumulative increases in population that would generate an increase in demand for local housing and local public services. While continued development of the area would likely result in an increase in population and require the need for new housing and expanded public service facilities, operation of the proposed LEC would not contribute to these impacts. Despite the potential for construction schedule overlaps with known projects within the proposed LEC study area, no adverse cumulative socioeconomic effects are anticipated from either the construction or operation of the proposed LEC. In addition, both the short-term construction-related and long-term operation-related spending activities of the LEC are expected to have cumulative economic benefits for the study area. The cumulative benefits would increase when revenues accrued as a result of the proposed LEC are combined with spending, and any local revenues accrued as a result of current and future reasonably foreseeable cumulative development projects.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits include both the short-term construction and long-term operational related increases in local expenditures and payrolls, as well as sales tax revenues. Estimated gross public benefits from the LEC include increases in sales taxes and employment payrolls. **Socioeconomics Table 5** provides a summary of economic benefits of the LEC.

Socioeconomics Table 5
LEC Economic Benefits (2008 dollars)

Fiscal Benefits	
Estimated annual property taxes	None[1]
State and local sales taxes: Construction	$155,000 – $310,000
State and local sales taxes: Operation	$170,500
School Impact Fee	$2,350
Non-Fiscal Benefits	
Total capital costs	$298 million
Construction payroll	$26.8 million
Annual Operations and Maintenance	$3.5 million
Construction materials and supplies	$275 million
Operations and maintenance supplies	$2.9 million
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Construction	305 jobs (maximum)
Operation	7 jobs (maximum)
Estimated Indirect Employment	
Jobs	29 jobs
Income	$1.1 million
Estimated Induced Employment	
Jobs	61 jobs
Income	$2.1 million

Source: NCPA 2008a.

1 LEC is not expected to pay property taxes since the City of Lodi is one of the Northern California Power Agency (NCPA) project participants for the LEC project (State of California 2008).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

As of publication of the Staff Assessment (SA), staff has not received any public comments regarding socioeconomic issues.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are required for socioeconomic resources because no significant adverse socioeconomics impacts would occur as a result of construction and operation of the proposed LEC.

CONCLUSIONS

No significant adverse socioeconomics impacts would occur as result of the construction or operation of the proposed LEC project. Staff believes the LEC would not cause a significant adverse direct, indirect, or cumulative impact on population, employment, housing, public finance, local economies, or public services. In addition, because there would be no adverse project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted. The proposed LEC would benefit the study area in terms of an increase in local expenditures and payrolls during construction and operation of the facility. These activities would have a positive effect on the local and regional economy.

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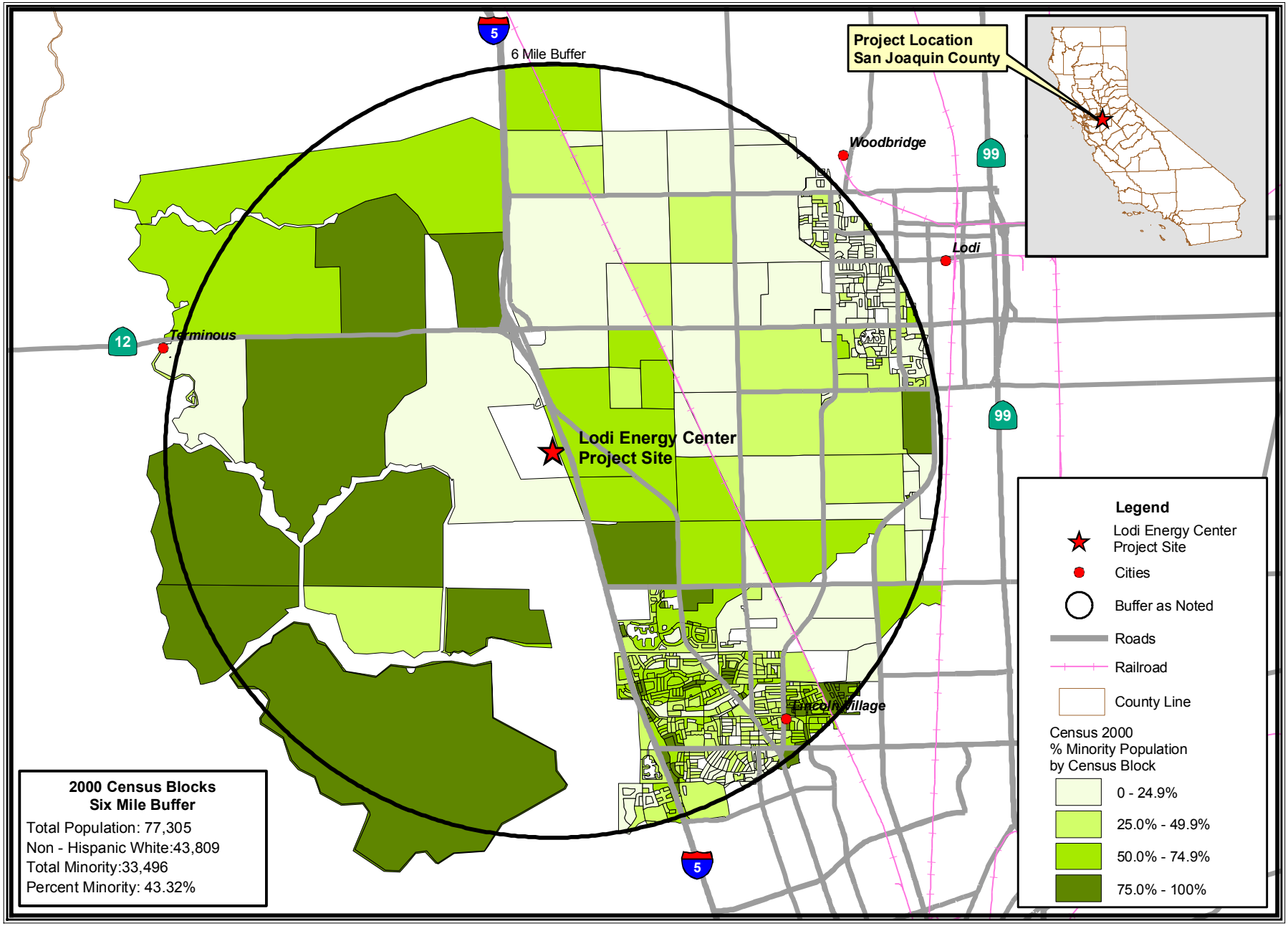
SOCIOECONOMICS - FIGURE 1

Lodi Energy Center Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



OCTOBER 2008

SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2008

SOURCE: California Energy Commission Statewide Power Plant Maps 2008 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Testimony of Paul Marshall CHG, CEG

SUMMARY OF CONCLUSIONS

Based on the assessment of the proposed Lodi Energy Center (LEC), California Energy Commission (Energy Commission) staff finds that:

- Soil sampling results reported by the applicant initially indicated there was significant contamination present on site. It was later determined the results were reported incorrectly. Staff is awaiting resubmission of corrected soil sampling results to evaluate whether there are any potential health and safety impacts to workers and the public.
- Implementation of best management practices during LEC construction and operation in accordance with effective Storm Water Pollution Prevention Plans and a Drainage, Erosion, and Sediment Control Plan would avoid significant adverse effects caused by the transport of sediment contaminants from the LEC site by wind or water erosion.
- Compliance with the City of Lodi's municipal codes for construction within a special flood hazard zone would require that all building and equipment foundations be elevated 18 inches or more above the 100-year base flood elevation.
- The use of recycled water for LEC construction and operation would be in compliance with state water use policy and would have no adverse environmental effect provided the requirements of Condition of Certification **SOIL&WATER-4** are met.
- The disposal of industrial wastewater by deep well injection to a confined aquifer at a depth of approximately 4,500 feet below ground surface would not degrade surface or groundwater quality.
- The proposed project would comply with all applicable federal, state, and local laws, ordinances, regulations, and standards with the adoption of the recommended conditions of certification.
- Construction and operation of LEC would not result in any unmitigated project-specific or cumulative significant impacts to soil or water resources with the adoption of the recommended conditions of certification.

INTRODUCTION

The Northern California Power Agency (NCPA) proposes to construct a nominal 296-megawatt (MW) combined-cycle power plant and associated infrastructure. This section of the Staff Assessment (SA) presents an evaluation of the potential impacts to soil and water resources from the construction and operation of the proposed LEC. This assessment incorporates information provided to the Energy Commission staff as of March 2008, and focuses on the potential for the LEC to:

- Cause accelerated wind or water erosion and sedimentation;

- Exacerbate flood conditions in the vicinity of the project;
- Adversely affect surface-water or groundwater supplies;
- Degrade surface-water or groundwater quality; and
- Comply with all applicable laws, ordinances, regulations, and standards (LORS).

Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and, as appropriate, recommends conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS. The mitigation of any potentially contaminated soil is addressed in the **WASTE MANAGEMENT** section of this SA.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Soil and Water Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Clean Water Act (33 USC, §§ 1251 et seq.)	Requires states to set standards to protect water quality, which includes regulation of storm water discharges during construction and operation of power plant facilities
Safe Drinking Water Act (40 CFR, parts 144 through 147)	Requires the United States Environmental Protection Agency (USEPA) to develop minimum federal requirements for the Underground Injection Control (UIC) programs to prevent injection wells from contaminating underground sources of drinking water.
State	
California Water Code, section 13260	Requires filing with the appropriate Regional Water Quality Control Board (RWQCB) a report of waste discharge for those discharges that could affect the water quality of the state.
California Water Code, section 13523	Requires the Central Valley Regional Water Quality Control Board (CVRWQCB) to prescribe water reuse requirements for water that is to be used as recycled water after consultation with the Department of Public Health (DPH).
California Water Code, section 13550	Prohibits the use of potable water for non-potable uses if recycled water is available and upon other criteria such as the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, and the use is not detrimental to public health.
Title 17 California Code of Regulations,	Requires prevention measures for backflow and cross connection of potable and non-potable water lines.
Title 22, California Code of Regulations	Requires the California Department of Public Health (DPS) to review and approve the wastewater treatment systems to ensure they meet tertiary treatment standards.
Title 23, California Code of Regulations	Requires the RWQCB to issue waste discharge requirements specifying conditions for protection of water quality.

Applicable Law	Description
Public Resources Code, sections 25300 through 25302	Requires the Energy Commission to conduct assessments and forecasts of all aspects of energy production to develop energy policy that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety.
Local	
Lodi Municipal Code, Title 8, Chapter 8.08	Requires a well boring permit application be submitted to the San Joaquin County Environmental Health Department prior to placement of a well.
Lodi Municipal Code, Title 15, Chapter 15.60	Addresses flood damage prevention and sets guidelines for development in a flood hazard area.
State Policies and Guidance	
California Constitution, Article X, section 2	Requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use, or unreasonable method of use of water is prohibited.
Integrated Energy Policy Report (Pub. Resources Code, Div. 15, § 25300 et seq.)	In the *2003 Integrated Energy Policy Report*, consistent with State Water Resources Control Board Resolution 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."

SETTING

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed LEC site is in rural San Joaquin County situated on the eastern edge of the Sacramento-San Joaquin Delta. The project site would be located southwest of the intersection of Highway 12 and Interstate 5 on land owned and incorporated by the City of Lodi (City). The LEC would be constructed on a 4.4-acre parcel adjacent to the City's White Slough Water Pollution Control Facility (WPCF) and the existing NCPA Combustion Turbine Project #2 (STIG). Construction laydown and parking areas would be located on four parcels totaling 9.8-acres within the existing boundaries of the WPCF (NCPA 2008a, sections 2.0 & 2.2.1 and Appendix 5.14A section 3.5). Natural gas would be provided by Pacific Gas & Electric Company (PG&E) through a 2.7-mile pipeline that PG&E would construct, own, and operate. A more complete description of the project that includes site layout and regional maps is contained in the **PROJECT DESCRIPTION** section of this SA.

SOILS

The topography of the proposed site is generally level with an average elevation of approximately five feet above mean sea level (amsl). The 14.2-acres that comprise the

plant site and laydown areas would be located on soil identified as Devries sandy loam. This soil type is formed from the mixed rock alluvium that characterizes the basin rim of the San Joaquin Delta (NCPA 2008a, section 5.11.1).

Silty sands were encounter to depths of approximately 10 feet during field exploration of the 4.4-acre power plant site. The silty sands were underlain by a zone of clayey sand to a depth of approximately 13 feet. Because of the potential for liquefaction and differential settlement of the near surface sandy soil, over excavation to a depth of approximately five feet is recommended in the geotechnical feasibility study conducted for the LEC site. (NCPA 2008a, Appendix 2C, section 4.9).

GROUNDWATER

The LEC project site is within the San Joaquin Valley Groundwater Basin within the Eastern San Joaquin Subbasin (basin). The basin is drained by the San Joaquin River and several major tributaries including the Stanislaus, Mokelumne, and Calaveras rivers. Groundwater levels in the basin have shown a continuous decline over the past 40 years. During this period, groundwater levels have declined at an average rate of 1.7 feet per year. Groundwater salinity along the western edge of the Delta are elevated as a result of the brackish to saline surface waters that intruded into the Delta and San Joaquin River prior to the advent of the Delta water projects (State Water Project and Central Valley Project) (NCPA 2008a, section 5.15.1.2 and YWA 2006, sections 5.4 & 5.6).

Groundwater elevations near the LEC site fluctuate seasonally in response to variations in precipitation. Groundwater fluctuations are lowest to the west of the project site because of less groundwater pumping and uniform recharge throughout the year. Groundwater elevations at production wells near the LEC project site typically fluctuate by up to 10 feet annually. In February 2008, the static groundwater level was reported at about nine feet below ground surface (bgs) in monitoring well WSM-2 located near the southeast corner of the LEC site. (NCPA 2008a, section 5.15.1.2 & Appendix 2C, section 3.2.2).

SOIL CONTAMINATION

The results of the preliminary soil sampling and analytical testing in the Phase II ESA discussed in the **WASTE MANAGEMENT** section initially indicated that the LEC site has been affected by previous site activities, including deposition of wastewater pond sludge, and storage of various materials such as concrete curing compounds, automobile batteries, and lubricating compounds. Residual contaminants detected at the site include metals, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPHs) (CH2MHILL 2009e Data 52). When the results from the Phase II were originally presented to Energy Commission and DTSC staff, they showed high levels of contaminants. Some of these residual contaminants were listed at concentrations above the risk-based industrial soil criteria. Based on the initial interpretation of the results, Energy Commission staff determined that there may be a potential contaminant exposure issue for construction workers and onsite industrial workers due to surface and subsurface soils that could result in adverse health effects.

However, it was later determined that there was an error in the presentation of the Phase II ESA soil sampling data analysis. This error in presentation of the data resulted in DTSC initially determining that the site soil was heavily contaminated and required remedial action prior to industrial use (Gillette 2009). Staff and DTSC are currently awaiting resubmission of the corrected results to determine whether any further characterization and remediation may be necessary. This information is need for staff to complete analysis of potential waste management impacts to soil and water resources.

SURFACE HYDROLOGY

The proposed LEC and the adjacent WPCF are located within the legal boundary of the Sacramento-San Joaquin Delta (Delta). The Sacramento and San Joaquin rivers combine to form the Delta. The lands and waterways within the Delta have been highly modified by channelization and water diversions, and its lands and waterways provide essential habitat for fish and wildlife (DWR 1993 and YWA 2006, section 3.3.1).

Numerous natural and developed surface water bodies occur near the proposed LEC site. To the west, are numerous sloughs, cuts, and canals that deliver surface water to local farmers. The major Delta waterways located near the site are Bishop Cut, White Slough, and Dredger Cut. About 1,500 feet west of site, several elongated water bodies occur that were formed from the borrow pits that provided construction fill for Intestate 5. The pits were intended to be part of the Peripheral Canal, but are now open water bodies that are not connected to the Delta and are recharged by precipitation (NCPA 2008h, Appendix B).

Other local water bodies adjacent to the proposed site are the percolation ponds at the WPCF and a small-unnamed Delta channel that discharges to Dredger Cut. The southern portion of the LEC site is bordered by this unnamed channel, which currently receives storm water runoff from the site (YWA 2006, section 3.3.1 and NCPA 2008a, section 5.15.1.1).

Project Water Supply

Recycled water would be used during construction and operation of the proposed LEC. Recycled water would be provided from the COL's WPCF and potable water from a new on-site well. Under normal operating conditions, NCPA estimates that the annual average daily consumption of recycled water would be 1.84 million gallons per day (mgd) (CH2MHILL 2009 c). The maximum daily consumption of recycled water (summer use case) would be 2.61 mgd. The LEC's expected average annual recycled water use, based on a 70-80% facility operation capacity factor (approximately 7,000 hours of operation per year), would be 1,651 acre-feet per year, with a maximum consumption of 1,800 acre-feet per year (AFY) (CH2MHILL 2009 c). During construction, recycled water would be used for dust control, soil compaction, concrete curing, and other miscellaneous non-potable uses (NCPA 2008a, section 2.1.10.1 & Table 2.1-2).

Potable water would be supplied to the LEC from an on-site well that would be constructed as part of the project. NCPA proposes to draw high quality groundwater from the Laguna Formation, which begins at a depth of about 50 feet. The on-site well is expected to have sufficient capacity to supply 450 gallons per day (gpd) of groundwater

suitable for potable use. The overall volume of potable water to be used by the LEC is expected to be less than 0.4 AFY with a maximum pumping rate of less than 1 gallon per minute (gpm). NCPA expects that all pumped water will be consumptively used and no groundwater return flows would occur (NCPA 2008a, section 5.15.2.2.4).

Process and Sanitary Wastewater

NCPA proposes to discharge up to 189 gpm of non-hazardous process wastewater to an on-site Class I injection well (CH2MHILL 2009 c). Presently, NCPA owns and operates a Class I injection well for wastewater injection at the STIG facility. NCPA has submitted a new Underground Injection Control (UIC) permit application to the USEPA Region IX for the combined STIG-LEC facility. The application contains the initial underground injection well application for the LEC injection well that would support LEC operation, a re-application for the existing STIG injection well, and an application for a third injection well for future use as a backup injection well (NCPA 2008a, section 5.15.1.5).

The plant wash water from the equipment drains would pass through an oil-water separator and wastewater sump before reuse in the cooling tower and eventual discharge to the atmosphere through evaporation. The oil and sludge removed from the wash water would be disposed of offsite. Wastewater from the safety showers and eyewash would also be discharged to the atmosphere through evaporation in the cooling tower. Sanitary wastewater from the restrooms would be minimal and would be discharged to the WPCF (NCPA 2008a, section 5.15.1.5).

Storm Water

The existing LEC site is a basin-like area with a natural swale along the southwest corner of the site. The site is undeveloped with a moderate amount of seasonal grass and weeds. The maximum site elevation is approximately 12 feet amsl where an existing dirt road rises to intersect a paved road on the northern boundary of the project. From the northern boundary, the site slopes downward into a depressed area at an elevation of approximately 5 feet amsl. This depressed area is bisected by the access road to the STIG facility (NCPA 2009a, Attachment DR37-1).

A culvert under the access road allows storm water runoff to flow from the northern area of the site into a natural drainage swale along the southern boundary. The low point of the site along the southern boundary is approximately 3.5 feet amsl. A culvert is in place in the southern portion of the site to convey storm water runoff to the natural drainage channel. Through this drainage channel, the LEC site indirectly discharges storm water runoff to Dredger Cut. Dredger Cut drains into White Sough, which ultimately drains to the San Joaquin River (NCPA 2008a, section 5.15.1.6, NCPA 2009a, Attachment DR37-1, and YWA 2006, section 3.3.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The LEC was evaluated to determine whether the construction or operation of the project would contribute to erosion, sedimentation, flooding, and degradation of water

quality and water supply. Compliance with the comprehensive regulatory procedures that have been adopted, absent unusual circumstances, would ensure that impacts would not occur. The regulatory procedures typically offer a suite of options for addressing the potential impacts and include performance standards so that impact avoidance or minimization is ensured.

The federal and state LORS and state and local policies presented in **Soil and Water Table 1** were used to determine the significance of potential impacts for this assessment. The following LORS and state and local policies are of particular relevance when determining the significance of potential impacts associated with the project.

- The Clean Water Act requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water.
- The Safe Drinking Water Act requires USEPA to develop minimum federal requirements for the Underground Injection Control (UIC) programs to prevent injection wells from contaminating underground sources of drinking water.
- California Water Code, section 13523 requires the Central Valley Regional Water Quality Control Board (CVRWQCB) to prescribe water reuse requirements for water that is to be used as recycled water after consultation with the Department of Public Health (DPH) to ensure such actions are protective of the public health, safety, or welfare.
- California Water Code, section 13550 prohibits the use of potable domestic water for nonpotable uses if recycled water is available.
- California Code of Regulations, Title 17 specifies requirements for backflow prevention and cross connections of potable and non-potable water lines.
- California Code of Regulations, Title 22 requires the DPH to review and approve the use and disposal of recycled water to ensure public health and safety.
- City of Lodi Municipal Code, Title 8, Chapter 8.08 requires the project owner to submit a well boring permit application to the San Joaquin County Environmental Health Department prior to placement of a well.
- City of Lodi Municipal Code, Title 15 and Title 17 set guidelines for development in a flood hazard area and addresses flood damage prevention.
- California Energy Commission *2003 Integrated Energy Policy Report* prohibiting the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound.

For impacts that either exceed published standards or do not conform to established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts and mitigation, presented below, is divided into separate sections relating to construction and operation of the LEC. For each potential impact discussed, both the applicant's proposed mitigation and staff's

determination of the adequacy of that proposed mitigation are discussed. If necessary, staff will propose additional mitigation measures and refer to specific conditions of certification relating to a potential impact and its required mitigation measures.

Construction Impacts and Mitigation

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and the disturbance of saturated soils. Activities that expose or disturb soil, leave soil particles vulnerable to detachment by wind and water. Water quality could be impacted by the discharge of eroded sediments from the site, the release of hazardous materials during construction, or the migration of existing hazardous materials present in the subsurface soil. Potential construction-related impacts to soil, storm water, surface and groundwater quality, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Water and Wind Erosion

The project site would require earthwork to construct the LEC and associated facilities. Soil disturbing activities would consist of grubbing and clearing, rough grading, excavating, filling, compaction, and final grading. For all areas where earthwork activities would occur, NCPA proposes to stockpile materials suitable for compaction in on-site locations. Materials not suitable for compaction would be stockpiled in separate areas for reuse as appropriate (NCPA 2009a, Attachment DR37-1, section G).

NCPA proposes to prepare a Drainage, Erosion, and Sediment Control Plan (DESCP) and Storm Water Pollution Prevent Plan (SWPPP). NCPA has submitted a draft DESCP and preliminary SWPPP and estimates that the volume of soil that would be over excavated and recompacted as engineered fill would be 19,656 cubic yards (cy) with an additional 8,747 cy required to provide a level pad for the LEC facility. After the final grade and elevation have been established, the major equipment foundations and underground utilities would be excavated and back filled. NCPA proposes to use only licensed commercial fill that would not require a borrow or disposal site (NCPA 2009a, Attachment DR37-1, section G).

Construction activities would increase short-term soil erosion. Within the draft DESCP and preliminary SWPPP, NCPA proposes best management practices (BMPs) for erosion control during the construction phase of the LEC. NCPA proposes to deploy BMPs in sequence with plant grading and construction activities. The proposed construction BMPs include silt fences, straw wattles, stabilized construction entrance, temporary drainage channels, sediment traps and basins at boundary outfalls. Dust suppression would be accomplished by applying water (NCPA 2008c, section III.E)

Adherence to the procedures in the construction SWPPP and DESCP would limit both erosion and the migration of contaminants (that may be disturbed by construction) from entering adjacent surface water bodies. These plans require the project owner to test and monitor soil and run-off from the LEC site. Staff agrees that the proper selection and implementation of BMPs can reduce the impact of water and wind erosion to soil resources to a level that is less than significant and recommends the adoption of Conditions of Certification **SOIL&WATER-1 and -2**.

Condition of Certification **SOIL&WATER-1** requires the project owner to comply with all the requirements of the NPDES General Permit for Strom Water Discharges Associated with Construction Activities (WQO 99-08-DWQ), including the development and implementation of a construction SWPPP. Condition of Certification **SOIL&WATER-2** requires the project owner to obtain the Compliance Project Manager's (CPM) approval for a site specific DESCP that addresses all project elements and ensures protection of soil and water resources during construction of the LEC.

Surface and Groundwater Quality

NCPA expects construction of the LEC to last 24 months and would require approximately 36,000 gallons per day (gpd) of recycled water. Degradation of surface and groundwater quality from sediment-laden runoff during excavation and grading could occur as well as contamination of groundwater from improper storage or use of construction materials (NCPA 2008a, sections 5.15.1.4.3 & 5.15.2.1.2).

Impacts to surface water quality would primarily consist of increased turbidity due to erosion of newly excavated or placed soils. Water used for dust control and soil compaction during construction is not expected to result in a discharge to surface water due to the minimal amount of water that would be used for this purpose. Sanitary waste would be collected in portable toilets supplied by a licensed contractor for collection and disposal at an appropriate receiving facility. NCPA proposes to collect equipment wash water for disposal offsite (NCPA 2008a, section 5.15.2.1.2).

NCPA does not propose to use groundwater during construction of the LEC; although, construction activities could potentially affect groundwater quality through inadvertent spills or discharge that could then infiltrate into the groundwater. Groundwater beneath the site fluctuates seasonally and is found at depths between 2 to 14 feet bgs. NCPA has prepared a preliminary construction SWPPP that includes BMPs for erosion and sediment control, non-visible pollutant monitoring and sampling, and non-storm water management, but they do not propose a BMP for dewatering deep excavations that may encounter groundwater. To prevent surface water degradation due to dewatering activities, staff recommends Condition of Certification **SOIL&WATER-3**, which would require the project owner to complete Notice of Intent (NOI) for compliance with CVRWQCB Order No. R5-2008-0081 for Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters. Staff believes that compliance with Conditions of Certification **SOIL&WATER-1, -2 and -3** would reduce construction impacts to water quality to a less-than-significant level. (NCPA 2008a, section 5.15.2.2.4, NCPA 2008c, and CVRWQCB 2008).

Flooding Potential

The proposed LEC site and WPCF are located within the 100-year flood plain (Zone A) as defined by the Federal Emergency Management Agency (FEMA). As determined by FEMA, the site is located within a flood hazard zone with a base flood elevation (BFE) of 8-feet amsl. For the LEC to be licensed by the Energy Commission, all power plant curbs, structures, and foundations must be at least 1-foot above the BFE (NCPA 2008a, section 5.15.1.3 and Figure 5.15-4).

NCPA proposes to elevate the LEC site above the BFE in accordance with the COL's requirements for construction within a special flood hazard zone. NCPA proposes to comply with COL Municipal Codes, Title 15, Buildings and Construction, Chapter 15.60 Flood Damage Prevention and Title 17, Zoning, Chapter 17.51 FP Flood Plain District. In addition, the COL's General Plan states that the COL shall only permit development in the 100-year floodplain consistent with FEMA regulations (NCPA 2009d, Data Response WSQ-8).

The COL, as a participating community in the National Flood Insurance Program, is responsible for maintaining flood plain management regulations that meet or exceed FEMA requirements. Staff agrees that conformance with COL Municipal Codes ,Title 15, Chapter 15.60, and Title 17, Chapter 17.51 would comply with FEMA regulations and the Energy Commission requirements that all new structures within a flood hazard zone have a minimum first floor or foundation elevation at least 1-foot above the BFE. Staff takes special notice of COL Municipal Codes, Title 17, Chapter 17.51, section 17.51.140 (Non-residential structures) and Title 15, Chapter 15.60, section 15.60.140(C)(1) (Standards of construction), which are excerpted from Titles 17 and 15, Chapters 17.51 and 15.60 respectively.

> **Section 17.51.140:** New nonresidential structures shall be flood proofed or elevated eighteen inches or more above the level of the base flood.
>
> **Section 15.60.140 (C) (1):** New construction and substantial improvement of any structure shall have the lowest floor, including basement, elevated to or above the base flood elevation. Nonresidential structures may meet the standards in subdivision 2 of this subsection. Upon the completion of the structure the elevation of the lowest floor, including basement shall be certified by a registered professional engineer or surveyor, or verified by the community building inspector to be properly elevated. Such certification or verification shall be provided to the floodplain administrator.

Staff agrees with NCPA that adherence to the COL's floodplain development requirements will render the project consistent with FEMA regulations and Energy Commission standards and recommends Condition of Certification **SOIL&WATER-4**. Condition of Certification **SOIL&WATER-4**, requires the project owner to comply with COL Municipal Codes ,Title 15, Chapter 15.60, and Title 17, Chapter 17.51 and that a copy of the elevation certification or verification be submitted to the CPM stating that the LEC has been elevated eighteen inches or more above the level of the base flood. Staff believes that designing and elevating the LEC site above the BFE consistent with the COL Municipal Code Title 15 and Title 17 would ensure the project would not contribute to upstream and downstream flooding impacts.

Operation Impacts and Mitigation

Operation of the LEC project could lead to potential impacts to soil, water supply, and surface or groundwater quality. Soils may be impacted through erosion or the release of hazardous materials used during operation of the project. Storm water runoff from the site could result in increased runoff flow rates and discharge volumes to existing storm drain systems or surface water bodies. Water quality could be impacted by the discharge of eroded sediments from the site, the discharge of wastewater, or the

release of hazardous materials during operation. The water supply for plant operation could lead to potential impacts to the existing recycled water supply and the use of recycled water for other purposes.

Potential impacts to soil, storm water, water supply, and water quality related to the operation of the proposed LEC, including NCPA's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil

The operation and maintenance of the proposed LEC would not involve soil-disturbing activities. During plant operation, the LEC site would be covered with impervious material, gravel, or landscaping that would minimize the exposure of on-site soil to wind or water erosion. The water and gas pipelines would be underground and routine vehicle traffic would be limited to existing paved roads (NCPA 2008a, section 5.11.2.6).

The project owner would be required to develop and implement an industrial SWPPP in conformance with the NPDES General Permit for Storm Water Discharge Associated with Industrial Activities (WQO 97-03-DWQ). The industrial SWPPP would include BMPs for refueling and maintenance of equipment, protection of hazardous materials from storm water exposure, and the preparation and implementation of spill contingency plans. Staff believes that with proper implementation of these and other BMPs in the industrial SWPPP no significant impacts to soil resources or surface water quality would occur during the long-term operation of the LEC. Staff recommends Condition of Certification **SOIL&WATER-5**, which would require the project owner to prepare and submit an industrial SWPPP to the CPM. With implementation of the site-specific industrial SWPPP that is in conformance with the provisions of WQO 97-03-DWQ no adverse impacts to soil resources from plant operation are expected.

Storm Water

Development of the LEC site would increase the impervious surface area, but the proposed storm drain system would provide a post construction discharge rate similar to the pre-construction rate. NCPA proposes to construct an underground storm drain system that would include sufficient detention volume and flow controls. Design of the storm drain system would be incorporated into the final LEC design and would contain the detailed design and calculations for detention storage volume and flow control devices (NCPA 2008a, section 5.15.2.2.1 and NCPA 2009a, Attachment DR37-1)

The project owner is required to develop an industrial SWPPP that meets performance and monitoring standards established by the CVRWQCB. The industrial SWPPP would require BMPs that would minimize on-site contaminants from coming in contact with storm water runoff. Staff requires the preparation of an industrial SWPPP in Condition of Certification **SOIL&WATER-5**. With implementation of the site-specific industrial SWPPP, the impacts of storm water runoff during LEC operation would be less than significant.

Industrial Water Supply

NCPA proposes to use recycled water provided by the COL from the adjacent WPCF for industrial purposes. In its initial "will serve" letter dated October 16, 2008, the COL

states that it has agreed to serve recycled water to the LEC. The COL goes on to state that the WPCF has sufficient capacity to serve the LEC as discussed in its original "will serve" letter dated November 19, 2005. Within the November 19, 2005 letter, the COL commits to providing the LEC tertiary treated recycled water that meets State of California Title 22 requirements at a peak delivery rate of approximately 2.5-mgd (1.7-mgd average) (NCPA 2008b, Attachment DA 5.15-3 and NCPA 2009c, Attachment WSQ3-1). However, due to the equipment design changes made to the project as set forth in AFC Supplement D, the NCPA now expects to use a maximum of 2.61-mgd of recycled water under the summer maximum use case, with an average use of 1.84 mgd. To address the project's proposed increase in recycled water use, COL provided an updated "will serve" letter to NCPA on July 24, 2009. In this letter the City stated that it can supply the project with the 1,800 AFY of recycled water identified as the project maximum water demand in AFC Supplement D. The City also stated that it "has sufficient capacity to serve both the LEC plant as well as existing users even with the increased water need resulting from the change in equipment described in the AFC Supplement" (CH2MHILL 2009 c, Appendix F).

Based on the WPCF's proven record of recycled water production and delivery to the STIG, staff is confident that a long-term recycled water supply from the WPCF would be available for LEC operation. To ensure a reliable long-term recycled water supply, staff proposes Condition of Certification **SOIL&WATER-6** that requires the project owner to execute a long-term (30 – 35 years) Recycled Water Supply Agreement with the COL that specifies a maximum daily supply of 2.61-mgd with a total annual maximum supply of 1,800 AFY. With the submittal of a signed water supply agreement from the COL per Condition of Certification **SOIL&WATER- 6**, a reliable long-term recycled water supply for operation of the proposed LEC would be achieved.

The production and use of recycled water is regulated under federal and state law. The State Water Resources Control Board (SWRCB) shares jurisdiction with the Regional Water Quality Control Boards (RWQCBs) and DPH over the production and use of recycled water. The SWRCB exercises general oversight over recycled water projects, while DPH is charged with the protection of public health and drinking water supplies through the development of uniform water recycling criteria. Under California Water Code, sections 13522.5, 13523, and 13523.1, any person who proposes to produce or use recycled water must file a report and obtain water reclamation requirements or a master reclamation permit from the appropriate RWQCB.

One of the primary conditions for the use of recycled water is protection of public health. The current Water Recycling Criteria (Title 22, California Code of Regulations, sections 60301 through 60355) require the submission of an engineering report to the RWQCB and DPH before recycled water projects are implemented. For existing recycled water projects, the report must be amended prior to any modifications or expansion.

In addition, Title 17, California Code of Regulations addresses the health and safety requirements of backflow prevention and cross connection of potable and non-potable water lines. Through the approval of the engineering report by DPH, that includes the backflow prevention and cross connection provisions of Title 17, the health and safety requirements of Title 17 and Title 22 would be met. To ensure compliance with federal and state laws, Condition of Certification **SOIL&WATER-6** also includes the provision

that the project owner submit a copy of an approved engineering report and any other DPH or RWQCB permit to the CPM prior to the delivery of recycled water to the LEC.

Compliance with Condition of Certification **SOIL&WATER-6** would ensure that a long-term recycled water supply is available for LEC operation and that recycled water production and use would comply with the Clean Water Act, the California Water Code, and the California Code of Regulations. Through compliance with these federal and state laws, staff believes there would be no adverse impacts to soil or water resources from the production and use of recycled water at the LEC.

NCPA proposes to use groundwater from the on-site potable water well for a maximum of two weeks in the event the WPCF is unable to provide tertiary treated recycled water. If water from the WPCF is unavailable after two weeks, NCPA proposes to evaluate the options and technologies available at the time and would present mitigation measures to the Energy Commission for review and approval (NCPA 2009d, Attachment WSQ-5). Staff considers the biggest threat to recycled water production at the WPCF to be flooding. The WPCF is in the flood plain and is subject to periodic flooding. Although the WPCF has a back-up generator, it is not unreasonable to expect that site inundation and flood water damage to pumps and electrical systems would prevent the WPCF from producing recycled water for a period that could exceed two weeks. The same flooding conditions could also impact the pumps and electrical systems for the LEC groundwater well. Staff believes that without a backup water supply the LEC is at risk of a forced outage, which is a potential impact to the LEC operational reliability. Project reliability is discussed in the **POWER PLANT RELIABILITY** section of this SA. Use of the groundwater well is also further discussed in the section below.

Potable Water Supply

NCPA proposes to use groundwater from a new on-site well for all LEC potable water uses (eyewash stations, drinking fountains, showers, and toilet flushing). The onsite well would draw from the Eastern San Joaquin Subbasin (basin), and NCPA expects the well to have sufficient capacity to supply 450 gpd of groundwater for potable use. The overall consumption of potable water by the LEC is expected to be less than 0.4-AFY with a maximum pumping rate of less than 1 gpm (NCPA 2008a, section 5.15.2.2.4)

Groundwater is available within the basin to supply the LEC, and groundwater recharge and water-use return volume exceed the current and expected future pumping demand in the vicinity of the LEC site. Local sources of groundwater recharge include irrigation of Delta lands and seepage from related waterways, surface-water return from irrigated lands, percolation from WPCF storage ponds, and recharge from WPCF land application areas. NCPA proposes to submit a construction application to the San Joaquin County Environmental Health Department as required by the COL Municipal Code, Title 8 Health and Safety, Chapter 8.08.

Staff agrees with NCPA, that given the low production rate and temporary nature of use as a back-up supply relative to groundwater availability in the basin, the effect on local groundwater levels is expected to be negligible and would not significantly affect adjacent groundwater uses. Staff has proposed Condition of Certification **SOIL&WATER-7**, which requires the project owner to submit a well construction

application to the San Joaquin County Environmental Health Department as required by COL Municipal Code, Title 8, Chapter 8.08, and limits the proposed use of the well as a back-up supply to that volume analyzed herein.

Public Resources Code, sections 25300 through 25302, requires the Energy Commission to collect data on all aspects of energy production in order to develop energy policy for the conservation of resources, the protection of the environment, and to protect public health and safety. In order to collect power plant water consumption data, staff recommends Condition of Certification **SOIL&WATER-8** that would require the project owner to install metering devices prior to the use of recycled or potable water for LEC operation. Data from the metering devices would be used to prepare an annual water use summary that would be submitted to the CPM in the annual compliance report. This information is used for comparative purposes and to document power plant water consumption in order to develop and recommend water use policy.

Surface and Groundwater Quality

Operation activities at the proposed LEC would have minimal potential to adversely affect surface or groundwater resources in the vicinity of the LEC site. NCPA expects the post construction storm water runoff rate to be similar to the preconstruction rate; and through the preparation and implementation of an industrial SWPPP, the potential for increased sediment or contaminants to be conveyed offsite would be minimized.

In the vicinity of the LEC site, groundwater recharge and water-use returns exceed the current and expected future pumping demand. As described above, groundwater recharge in the vicinity of the LEC occurs from several sources. Once developed, the project would result in 4.4 acres of impervious surfaces, which would not substantially interfere with groundwater recharge. Staff finds that potential impacts to groundwater quality would be less than significant (NCPA 2008a, section 5.15.3).

Because the project would use only a small volume of groundwater, the project is unlikely to affect groundwater quality. No change in the existing physical or chemical conditions of groundwater resources are expected as a result of the LEC project and no impact to groundwater quality would occur. Compliance with Condition of Certification **SOIL&WATER-5**, which requires the project owner to prepare an industrial SWPPP in accordance with WQO 97-03-DWQ, would minimize impacts to surface and groundwater to a less than significant level.

Process Wastewater

NCPA proposes to discharge process wastewater to a new on-site Class I underground injection well to be constructed as part of the LEC project. The deep well injection system would be permitted through the USEPA's Underground Injection Control (UIC) program, which is a comprehensive regulatory program for the construction and operation of Class I injection wells. Class I permits allow the injection of hazardous and nonhazardous fluids (industrial and municipal wastes) into isolated formations beneath the lowermost underground source of drinking water.

The process wastewater would consist of tertiary treated makeup water and other recovered process wastewater streams. Process wastewater would be collected in the

wastewater discharge tank and conveyed via pipeline to the well pad for injection at a maximum rate of 189 gpm (CH2MHILL 2009 c). NCPA has applied to the USEPA for an Underground Injection Control (UIC) permit and proposes to install and test the injection well prior to the beginning of plant construction (NCPA 2008a, section 2.1.12.2 and NCPA 2008h, Attachment K).

The proposed groundwater injection zone beneath the site is within the Domengine Formation that extends from approximately 3,700 to 4,500 feet beneath the site. The upper confining zone is the Nortonville Formation and the lower confining zone is the Capay Formation. These confining zones are laterally extensive ranging in depth from 100 to 200 feet-thick and consist of marine and silty shale. These shale formations act as confining zones to prevent the relatively high saline LEC injection fluids from migrating into higher quality groundwater aquifers (NCPA 2008h, Attachment F and Table F-1).

The region surrounding the proposed well is characterized by a very low level of seismic activity. No active faults are mapped within 25 miles of the site, and no known faults are present in the area surrounding the site. The potential shaking hazard from seismic activity is relatively low, and subsurface faulting of the injection formation and confining zones would not create conduits for the migration of the LEC injection fluids (NCPA 2008h, Attachment F).

Staff finds that deep well injection, permitted by the USEPA, would not cause an adverse impact to soil or water resources and includes Condition of Certification **SOIL&WATER-9**. Condition of Certification **SOIL&WATER-9** requires the project owner to submit to the CPM a copy of the UIC permit issued by USEPA prior to site mobilization.

Plant and Sanitary Wastewater

The primary on-site wastewater collection system would collect drainage from the containment area wash down drains, sample drains, and equipment drains. Wastewater from these areas would be collected in a system of hub drains, sumps, and piping for routing to the oil/water separator and wastewater lift station for testing before discharge to the WPCF. Wash water from the combustion turbine would be collected in holding tanks or sumps for offsite disposal at an approved wastewater disposal facility.

The secondary wastewater collection system would collect sanitary waste from sinks, toilets, showers, and other sanitary facilities for discharge to the WPCF through an existing connection in the utility corridor that serves the STIG facility. The COL has provided NCPA a “will serve” letter indicating that there is sufficient capacity at the LEC to receive sanitary waste from the LEC. Therefore, the potential for adverse impacts from sanitary wastewater discharge to the WPCF would be minimal (NCPA 2008a, sections 2.1.12.1, 2.1.12.3, 5.15.3, and Appendix 2D).

CUMULATIVE IMPACTS AND MITIGATION

The LEC project would neither cause nor contribute to cumulative impacts to soil and water resources. Sound engineering practices and BMPs would be used in both the project’s design and operation. Storm water discharge would adhere to state and local

agency water quality standards contained in the COL municipal codes and CVRWQCB NPDES permit requirements. Drainage volume and peak-storm water flow rates would be managed in compliance with state discharge permits, and no significant impacts to either surface water or groundwater quality are expected during construction or operation of the LEC.

Soils

Construction activities relating to the LEC may cause a temporary increase in cumulative wind and water erosion due to soil-disturbing activities until either stabilized or covered with pavement. Implementation of the DESCP and the SWPPPs for all soil disturbing construction and industrial activities would mitigate impacts from soil erosion. Staff believes that the project's contribution to soil erosion impacts would not be cumulatively considerable.

Surface Hydrology

Disturbed soil could increase the sediment and pollutant loading to surface water bodies near the proposed LEC. However, no significant impacts are expected if BMPs are employed to minimize erosion during and after construction in accordance with the DESCP and SWPPPs. Both storm water and non-storm water discharge would be monitored and, if contaminated, properly disposed of.

Implementation of the DESCP and SWPPPs for all construction and operation activities, along with full compliance with state and local LORS, would mitigate the project's contribution to potential cumulative surface hydrology impacts to a level that is not cumulatively considerable.

Water Supply

Currently, the WPCF treats approximately 6.3 mgd of municipal wastewater from the COL and has a permitted capacity of 7 mgd. The COL's Phase 3 Improvements Project is currently underway and would increase the WPCF treatment capacity to 8.5 mgd and is permitted by the CVRWQCB to produce this volume of recycled water.

With the Phase 3 improvements, the COL would have sufficient recycled water supply and production capacity to meet the industrial needs of the LEC and its other recycled water customers (STIG, mosquito control facility, and irrigation of city-owned land). Staff has not identified any cumulative impacts from the proposed use of recycled water by the LEC.

Groundwater

The entire LEC site would be covered with impervious materials, gravel, or landscaping following construction. Chemical storage areas would have secondary containment, and all surface flow from plant drains would be collected in the underground drainage system for discharge to the WPCF. Therefore, no cumulative impacts to groundwater are expected.

Groundwater is available within the basin to supply the LEC, and the small volume of groundwater that would be used for potable purposes would not adversely affect the groundwater basin. Groundwater recharge exceeds the current and expected future

pumping demand in the vicinity of the LEC site, and no cumulative impacts to groundwater from pumping for potable use would occur.

Wastewater

Plant and sanitary wastewater would be discharged to the WPCF and the process and industrial wastewater streams would be disposed through a deep well injection system. No wastewater related cumulative impacts are expected.

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the LEC would satisfy the requirements of the NPDES permits and DESCP with the adoption of Conditions of Certification **SOIL&WATER-1, -2 and -4**. These conditions require the development and implementation of a DESCP (**SOIL&WATER-2**) in conjunction with the construction SWPPP (**SOIL&WATER-1**) and the industrial SWPPP (**SOIL&WATER-4**).

SAFE DRINKING WATER ACT

Through compliance with Conditions of Certification **SOIL&WATER-9**, the project owner would obtain final approval of the UIC Class I Permit from the USEPA Region IX.

CALIFORNIA WATER CODE, SECTION 13260

Through compliance with Conditions of Certification **SOIL&WATER-3,** the project owner would submit a Notice of Intent for compliance with CVRWQCB Order No. R5-2008-0081 that would establish waste discharge requirements prior to any dewatering activities associated with LEC construction or operation.

CALIFORNIA WATER CODE, SECTION 13523

Through compliance with Conditions of Certification **SOIL&WATER-4,** the CVRWQCB, after consulting with and receiving the recommendations from DPH, would prescribe water reclamation requirements for the production and use of recycled water for construction and operation of the LEC.

CALIFORNIA WATER CODE, SECTION 13550

Section 13551 of the California Water Code prohibits the use of potable domestic water for nonpotable uses if recycled water is available. Through the use of recycled water for construction and operation, the LEC would be fully compliant with this section of the water code.

TITILE 17 AND TITLE 22 CALIFORNIA CODE OF REGULATIONS

Through compliance with Conditions of Certification **SOIL&WATER-6,** the DPH would review and approve an engineering report for the transmission and use of recycled water.

CITY OF LODI MUNICIPAL CODE TITLE 8

Through compliance with Conditions of Certification **SOIL&WATER-7,** the potable water well and underground injection well would be permitted by the San Joaquin County Environmental Health Department.

CITY OF LODI MUNICIPAL CODE TITLE 15 AND TITLE 17

Through compliance with Conditions of Certification **SOIL&WATER-5,** the project owner would certify that the elevation of the LEC would be above the 100-year base flood elevation and in accordance with the COL flood plain construction and elevation requirements.

CALIFORNIA ENERGY COMMISSION INTEGRATED ENERGY POLICY REPORT: WATER USE AND WASTEWATER DISCHARGE POLICY

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, (policy), will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. Through the use of recycled water the LEC would comply with this policy.

PUBLIC RESOURCES CODE, SECTIONS 25300 THROUGH 25302

Through compliance with Conditions of Certification **SOIL&WATER-8**, information required by staff to conduct assessments and forecasts of potable and industrial water consumption by power plants is achieved.

CONCLUSIONS

Soil sampling results reported by the applicant initially indicated there was significant contamination present on site. It was later determined the results were reported incorrectly. Staff is awaiting resubmission of corrected soil sampling results to evaluate whether there are any potential health and safety impacts to workers and the public.

Except for the potential presence of contaminated soils, staff has not identified any unmitigated significant impacts to soil and water resources provided all proposed conditions of certification are met. Potentially significant impacts would be mitigated through the preparation and implementation of various construction and operating plans, which if not implemented, could result in soil erosion, contamination to surface and groundwater, or non-compliance with wastewater treatment and discharge requirements.

Development and implementation of the DESCP, the construction SWPPP, and the industrial SWPPP, along with compliance with dewatering and groundwater discharge requirements, per Conditions of Certification **SOIL&WATER-1 through -4,** would serve to mitigate potentially significant soil erosion and water quality impacts.

In addition, during construction and operation of the LEC, Conditions of Certification **SOIL&WATER-6, -7, and -9** would ensure that recycled water use and wastewater discharge are in compliance with federal, state and local LORS.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Storm Water Associated with Construction Activity (WQO 99-08-DWQ). The project owner shall develop and implement a Storm Water Pollution Prevention Plan (construction SWPPP) for the LEC site, laydown areas, and on-site linear facilities.

Verification: Prior to site mobilization, the project owner shall submit to the Compliance Project Manager (CPM) a copy of the construction SWPPP and retain a copy on-site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board (CVRWQCB) about the construction SWPPP within 10 days of its receipt or submittal. This information shall include a copy of the Notice of Intent and Notice of Termination for the LEC.

SOIL&WATER 2: Prior to site mobilization activities, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion, and Sediment Control Plan (DESCP) that ensures protection of water quality and soil resources associated with soil disturbing activities associated with the LEC site, laydown areas, and on-site linears. The DESCP shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in the rate and volume of storm water runoff, and identify all monitoring and maintenance activities. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and may incorporate by reference any SWPPP developed in conjunction with state or municipal NPDES permits. The DESCP shall be a separate document that contains elements A through I below:

A. Vicinity Map – Map(s) at a minimum scale 1”=100’ shall be provided indicating the location of all project elements (construction site, laydown areas, pipelines, etc.) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. Site Delineation – All areas subject to soil disturbance for the LEC (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities. The Site Delineation shall be at a minimum scale 1”=100’.

C. Watercourses and Critical Areas – On the Site Delineation, the location of all nearby watercourses including swales, storm drains, and drainage

ditches shall be shown. Indicate the proximity of those features to the LEC construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale 1”=100’ showing all existing, interim and proposed drainage systems, and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet.

E. **Drainage Narrative –** The DESCP shall include a narrative of the drainage measures to be taken to protect the site, downstream facilities, and watercourses. The narrative shall include the summary pages from the hydrologic and hydraulic analyses prepared by a professional engineer or erosion control specialist. The narrative shall state the watershed size(s) in acres used in the calculation of drainage control measures and text included that justifies their selection. The hydrologic and hydraulic analyses should be used to support the selection of BMPs and structural controls to divert off site and on-site drainage around or through the LEC construction and laydown areas.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The on-site locations of any disposal areas, fills, or other special features shall also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements of the LEC (project site, lay down area, transmission corridors, and pipeline corridors) whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. **Best Management Practices** – The DESCP shall identify on a water pollution control drawing (WPCD) the location of the site specific BMPs to be employed during each phase of construction (initial elevation, grading, linear excavation and construction, and final grading/stabilization). Treatment control BMPs used during construction should enable testing of storm water runoff prior to discharge to the storm water system. BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination.

I. **Best Management Practices Narrative –** The DESCP shall show the location (as identified on the WPCD), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, site elevation, and all project excavation and construction. Text with

supporting calculation shall be included for each project specific BMP proposed for use prior to initial site elevation, grading, and project excavation and construction. Text with supporting calculation shall be included for each project specific BMP. BMP. Separate BMP implementation schedules shall be provided for each project element

Verification: No later than 60 days prior to site mobilization, the project owner shall submit a copy of the DESCP to the CPM for review and approval. The DESCP shall include elements A through I for soil disturbing activities associated with site elevation, grading, foundation excavation, and site stabilization.

SOIL&WATER 3: If groundwater is encountered during construction or operation of the LEC, the project owner shall comply with the requirements of the CVRWQCB Order NO. R5-2008-0081 for Waste Discharge Requirements for Dewatering and Other Low threat Discharges to Surface Waters.

Verification: Prior to any groundwater discharge or dewatering activities, the project owner shall submit a complete Notice of Intent (NOI) to obtain coverage under CVRWQCB Order No. R5-2008-0081. The project owner shall submit copies to the CPM of all correspondence between the project owner and the CVRWQCB regarding Order No. R5-2008-0081 within 10 days of its receipt or submittal. This information shall include a copy of any waste discharge orders or other discharge requirements as determined by the CVRWQCB.

SOIL&WATER 4: The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Storm Water Associated with Industrial Activity (WQO 97-03-DWQ). The project owner shall develop and implement a Storm Water Pollution Prevention Plan (industrial SWPPP) for the operation of the LEC.

Verification: Prior to commercial operation, the project owner shall submit to the CPM a copy of the industrial SWPPP. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board regarding the industrial SWPPP within 10 days of its receipt or submittal. This information shall include a copy of the Notice of Intent for compliance with the General NPDES permit for operation of the LEC.

SOIL&WATER 5: The project owner shall comply with the City of Lodi (COL) Municipal Codes, Title 15, Chapter 15.60, and Title 17, Chapter 17.51 regarding construction in a flood hazard zone.

Verification: Prior to site mobilization, the project owner shall submit to the CPM a letter from the COL that states that the project has complied with the COL's flood plain construction and elevation requirements.

SOIL&WATER 6: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the City of Lodi (COL) for the long-term supply (30 – 35 years) of tertiary treated recycled water to the LEC. The agreement shall specify a maximum daily supply of 2.61mgd with a total annual maximum supply of 1,800 AFY. The agreement shall specify all terms and costs for the delivery and use of recycled water by the

LEC. The LEC shall not connect to the COL's recycled water pipeline without the final agreement in place and submitted to the CPM. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.

Verification: No later than 60 days prior to the connection to the COL's recycled water pipeline, the project owner shall submit two copies of the executed agreement for the supply and on-site use of recycled water at the LEC. The project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health prior to the delivery of recycled water from the COL.

SOIL&WATER 7: Prior to initiation of well construction activities, the project owner shall submit a well construction application to the San Joaquin County Environmental Health Department (SJCEHD) in accordance the City of Lodi (COL) Municipal Code, Title 8, Chapter 8.08. The application shall contain all documentation, plans, and fees normally required for SJCEHD's well permit. Copies shall also be submitted to the CPM for review and approval. The project shall not construct a supply well or extract and use any groundwater therefrom until the SJCEHD issues its written evaluation as to whether the proposed well construction and operation activities comply with all applicable county well requirements, and the CPM provides approval to construct the well. The project owner shall provide documentation to the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the Department of Water Resources (DWR) a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards and requirements for the life of the existing pumping well and any new pumping wells and shall provide the CPM with two (2) copies of all monitoring or other reports required for compliance with the SJCEHD's water well standards and operation requirements, as well as any changes made to the operation of the well.

Groundwater shall not be used for any facility operation activity that is suitable for non-potable water use unless the source of recycled water is unavailable in the event of an emergency. For purposes of this condition, the term emergency shall mean the inability for the LEC to take or for COL to deliver recycled water to the LEC in a quantity sufficient to meet LEC demand due to natural disaster or other circumstances beyond the control of the project owner and it is necessary for the LEC to continue to operate to serve any regulatory mandated requirements. The project owner shall not use potable water as an emergency backup supply for more than 14 calendar days of plant operation without CPM approval.

Verification: The project owner shall do all of the following:

1. No later thanthirty (30) days prior to the construction of the onsite water supply well, the project owner shall submit two (2) copies to the CPM of the water well construction application packet submitted to the SJCEHD.

2. No later than fifteen (15) days prior to the construction of an onsite water supply well, the project owner shall submit two (2) copies of the written concurrence document from the SJCEHD indicating that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

3. No later than 60 days after installation of any water supply well at the project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to the CPM. The project owner shall submit to the CPM together with the Well Completion Report a copy of well drilling logs, water quality analyses, and any inspection reports that may be completed.

During well construction and for the operational life of the well, the project owner shall:

1. Submit copies to the CPM any proposed well construction or operation changes for the wells.

2. Submit copies of any water well monitoring reports required by the SJCEHD.

3. No later than fifteen (15) days after completion of onsite water supply well, the project owner shall submit documentation to the CPM and the RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

SOIL&WATER 8: Prior to the use of potable or recycled water for operation of the LEC, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of potable and recycled water supplied to the LEC. The metering devices shall be operational for the life of the project. An annual summary of daily water use by the LEC, 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 for LEC operation, 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. 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-9: The project owner shall provide the CPM with evidence of a Class I Nonhazardous UIC Permit for the LEC injection well issued by the United States Environmental Protection Agency (USEPA). The project owner must

comply with the specific conditions regarding the construction and operation of the injection well including the water quality requirements for wastewater, sampling, analysis, and monitoring for the deep injection wells.

Verification: Prior to site mobilization, the project owner will obtain and submit to the CPM the final approval of the UIC Class I Permit issued by USEPA Region IX for the construction and operation of the LEC deep injection well. Changes to the design, construction or operation of the injection well permitted by the UIC Class I Permit will be noticed in writing to the CPM and USEPA Region IX.

During the life of the project, the project owner shall provide the CPM with the annual monitoring report summary required by the UIC Class I Permit and shall fully explain violations, exceedance, enforcement actions, or corrective actions related to permit compliance. The project owner will notify the CPM in writing of changes to the UIC Class I Permit that are instituted by either the project owner or USEPA Region IX including permit renewals.

REFERENCES

CH2MHILL 2009 c – Supplement D – Changes to Equipment and Project Fenceline, dated July 2009. Submitted to CEC Docket Unit on 08/11/09, tn 52595.

CVRWQCB 2008 – Central Valley Regional Water Quality Control Board. Order NO. R5-2008-0081, Waste Discharge Requirements for Dewatering and other Low Threat Discharges to Surface Waters, 2008.

DWR 1993 – Department of Water Resources. Sacramento-San Joaquin Delta Atlas, dated 1993.

NCPA 2008a - Application For Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008b - Data Adequacy Response, Supplement B, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

NCPA 2008 c - Data Adequacy Supplement B, Attachment 5.15-1, LEC Construction Stormwater Pollution Prevention Plan, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

NCPA 2008h - Permit Application for Class I Underground Injection Well, dated 10/10/08. Submitted to CEC Docket Unit on 10/10/08, tn 48556.

NCPA 2009a - Data Request Set 1A, Responses to Data Requests #s1-55, Attachment DR38-1, and Interconnection Facilities Study, dated 02/05/09. Submitted to CEC Docket Unit on 02/05/09, tn 50006.

NCPA 2009b – Lodi Energy Center/Northern California Power Agency Data Responses Set 1B. Response to CEC Staff Data Requests 13 and 37, dated 2/19/09. Submitted to CEC Docket Unit on 02/19/09, tn 50204.

NCPA 2009c - Supplement C-Natural Gas Supply Line Route Change, dated 3/19/09. Submitted to CEC Docket Unit on 03/19/09, tn 50601.

NCPA 2009d – Lodi Energy Center/Northern California Power Agency Data Responses Set 3. Response to Workshop Queries 3 through 27, dated 03/24/09. Submitted to CEC Docket Unit on 03/24/09, tn 50645.

YWA 2006 – West Yost Associates. Draft *Soil and Groundwater Investigation Existing Conditions Report*, dated September 2006.

TRAFFIC AND TRANSPORTATION

Testimony of David Flores

SUMMARY OF CONCLUSIONS

The Lodi Energy Center (LEC) would be consistent with the Circulation Element in the city of Lodi General Plan, Local Circulation Plans and Policies and all other applicable laws, ordinances, regulations, and standards. The project would not have a significant adverse impact on the local and regional road/highway network. During the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the city of Lodi and San Joaquin County. During the operational phase, the project would not adversely affect local roads or aviation operations associated with any airport flight traffic.

INTRODUCTION

In the traffic and transportation analysis, staff addresses the extent to which the project may impact the transportation system in the local area. This analysis includes the identification of 1) the proposed roads and routings to be used for construction and operation; 2) potential traffic-related problems associated with the use of those routes by construction workers and truck deliveries; 3) the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities; 4) the frequency of trips and probable routes associated with the delivery of hazardous materials; and 5) the possible effect of project operations on local airport flight traffic.

In addition to assessing potential project related impacts, staff has reviewed the applicable laws, ordinances, regulations, and standards (LORS) to determine compliance. The LORS that govern the project are listed below in **Traffic and Transportation Table 1**, followed by a discussion of the potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the CPP.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Title 14, Code of Federal Regulations (CFR) Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles that operate on public highways.
State	
California Vehicle Code, Division 2, Chapter. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14.1, Chap. 1 & 2; Div. 14.8; Div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.
Local	
City of Lodi General Plan Circulation Element	Requires level of service (LOS) C or better operating conditions for all roadway links and intersections.
San Joaquin County Regional Transportation Plan.	Establishes regional transportation goals, policies, objectives and actions for various modes of transportation, such as improvements to mobility, improvement of goods movement, etc.
County of San Joaquin 2010 General Plan Transportation Element	Requires level of service (LOS) C or better operating conditions for all county roadway links and intersections, except in a sphere of influence where the City has adopted LOS D or better on minor arterials and roadways.

SETTING

The proposed site for the LEC project is located in the city of Lodi, approximately six miles west of the Lodi city center, in San Joaquin County. The power plant site is on the west side of Interstate 5 (I-5) approximately 1.7 miles south of State Route 12 (SR 12). On the east side of the project site is the city of Lodi's White Slough Water Pollution

Control Facility (WPCF). The WPCF's treatment and holding ponds are located to the north, the existing Northern California Power Agency (NCPA) Combustion Turbine Project No.2 is located on the west and the San Joaquin Mosquito and Vector Control District facility is to the south.

Traffic and Transportation Figure 1, Regional Transportation System, shows the region surrounding the project site. Transportation figures are located at the end of this analysis.

CRITICAL HIGHWAYS AND ROADS

Interstate 5 (I-5) is a north-south freeway which extends from California to Washington. I-5 connects to SR-12 north of the project site and to State Route 4 (SR-4) south of the project site. Access to the project from I-5 is provided from the south using Thornton Road via West Eight Mile Road, and from the north using Thornton Road via SR-12.

SR 4 is an east-west freeway that connects Contra Costa County with San Joaquin County. SR 4 connects to I-5 to the south of the project site, and to State Route 160 (SR 160) to the west of the project site. In the vicinity of SR 160, SR 4 has two lanes in each direction. According to traffic counts published by Caltrans in 2006, the average daily traffic volume on SR 4 is 38,000 vehicles per day. Trucks are approximately 5% of all traffic.

SR 12 is an east-west state highway that provides indirect access to the project site from the northeast and northwest. It has one or two lanes in each direction in the vicinity of the LEC. According to Caltrans, the average daily traffic volume on SR 12 near the I-5 interchange is 22,200 vehicles per day. Trucks are approximately 14% of all traffic.

SR 160 is a north-south freeway that connects Contra Costa County to Solano County west of the project site. In the vicinity of SR 12, SR 160 has one lane in each direction. According to traffic counts published by Caltrans in 2006, the average daily traffic volume on SR 160 near the SR 12 interchange is 15,000 vehicles per day. Trucks are approximately 9% of all traffic.

North Cord Road is a north-south roadway that connects the site entrance to North Thornton Road. It is an undivided road that has one lane in each direction. According to San Joaquin County, North Cord Road carries about 30 vehicles per day.

West Eight Mile Road is an east-west roadway that connects I-5 to North Thornton Road. It is a five-lane divided facility. According to San Joaquin County, West Eight Mile Road carries about 11,200 vehicles per day.

North Thornton Road is a two-lane, north-south, undivided roadway. North Thornton Road connects West Eight Mile Road to SR 12 to the west. The connection to the eastern segment of SR 12 and North Thornton Road is via De Broggi Road. According to San Joaquin County, North Thornton Road carries about 10,000 vehicles per day near Devries Road.

De Broggi Road is a two-lane, east-west roadway that connects North Thornton Road directly to the eastern segment of SR 12, and to SR 12 via Star Street. De Broggi Road carries about 600 vehicles per day.

LEVEL OF SERVICE

Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream. The term is used to describe and quantify the congestion level on a particular roadway or intersection and generally describes these conditions in terms of such factors as speed, travel time, and delay. The *Highway Capacity Manual*[1] defines six levels of service for roadways or intersections ranging from LOS A representing the best operating conditions and LOS F, the worst.

Traffic and Transportation Table 2 provides existing daily traffic volumes and LOS in and around the project area. Plant construction and operation traffic would use the existing local roadways, which would include North Thornton Road, West Eight Mile Road, De Broggi Road, North Devries Road and Cord Road. I-5 and State Route 12 are the principal highways in the area and are LOS C on a daily basis. Access to the site from the local roadways would be from North Thornton Road and a private access road off Cord Road which are operating at LOS A with free flowing traffic.

[1] National Research Council, *Highway Capacity Manual, Third Edition*, 1994.

Traffic and Transportation Table 2
Roadway/Freeway Segment Level of Service Existing Conditions

Roadway Segment	Between	Divided	No. of Lanes	Year ADT was Counted	Original Daily Demand	Adjusted Daily Demand	Truck Percent	Daily Capacity	Daily Demand with truck PCE=1.5	Daily V/C	LOS
N. Cord Rd.	Frontage Road and WPCF access Road	Undivided	2	1981	30	42	2%	12,000	43	0.00	A
W. Eight Mile Rd.	I-5 North Thornton Rd.	Divided	5	1996	11,158	13,166	2%	45,000	13,299	0.30	A
De Broggi Rd.	North Thornton Rd. and Star St.	Undivided	2	2008	565	565	14%	12,000	605	0.05	A
Flag City Boulevard	SR 12 and Republic Way	Undivided	2	2008	624	624	14%	12,000	668	0.06	A
Star Street	De Broggi Rd. and SR-12	Undivided	4	N/A	N/A	-	-	24,000	-	-	-
North Thornton Rd	W. Eight Mile Rd. and N. Devries Rd	Undivided	2	1993	9,685	11,864	2%	12,000	11,983	1.00	E
North Thornton Rd.	N. Devries Rd. and Frontage Rd.	Undivided	2	2003	9,286	9,982	2%	12,000	10,083	0.84	D
North Thornton Rd.	Frontage Rd. and De Broggi Rd.	Undivided	2	2004	3,534	3,746	2%	12,000	3,784	0.32	A
North Thornton Rd.	De Broggi Rd. and SR 12	Undivided	2	1993	9,775	11,974	14%	12,000	12,813	1.07	F
SR 4	Hillcrest Ave, Antioch and junction SR 160	Divided	4	2006	38,000	38,000	5%	80,000	39,021	0.49	A
SR 12	Junction SR 160 and I-5	Undivided	2	2006	22,200	22,200	14%	40,000	25,743	0.59	A

Roadway Segment	Between	Divided	No. of Lanes	Year ADT was Counted	Original Daily Demand	Adjusted Daily Demand	Truck Percent	Daily Capacity	Daily Demand with truck PCE=1.5	Daily V/C	LOS
SR 12	Junction I-5 and Thornton Rd.	Divided	4	2006	17,200	17,200	15%	80,000	18,516	0.23	A
SR 12	Thornton Rd. and lower Sac. River	Undivided	2	2006	15,200	15,200	9%	40,000	15,877	0.40	A
SR 160	Junction SR 4 and Contra Costa/ Sac. Co. line	Divided	2	2006	16,000	16,000	13%	40,000	17,049	0.43	A
SR 160	Contra Costa/Sac Co. Line and junction Route 12	Undivided	2	2006	15,000	15,000	9%	40,000	11,983	0.39	A
I-5	Hammer Lane, and Eight Mile Rd. Stockton.	Divided	6	2006	95,000	95,000	23%	120,000	10,083	0.88	D
I-5	Eight Mile Rd. junction with Route 12.	Divided	6	2006	77,000	77,000	16%	120,000	3,784	0.69	B
I-5	Junction Route 12 and Peltier Rd.	Divided	6	2006	64,000	64,000	16%	120,000	12,813	0.58	A

Source: LEC2009A, page 5.12-9 &10
[1]Segment operates at an unacceptable LOS
County of San Joaquin minimum acceptable LOS-C

Delays and LOS for the intersections in the vicinity of the project site are presented in **Traffic and Transportation Table 3**. Delays for the entire intersection are available for signalized intersections; if the intersection is stop-controlled, the delay for the controlled approach is available. All intersections operate at an acceptable level of service.

Traffic and Transportation Table 3
Existing Intersection Level of Service Summary

Intersection	Movement	Delay*	LOS
SR 12 and Flag City Boulevard (Stop Controlled)	Northbound Approach	17	C
West Eight Mile Road and SB I-5 Ramps (Signalized)	Entire Intersection	25	C
SR 12 and SB I-5 On-Ramp (Signalized)	Entire Intersection	8	A
West Eight Mile Road and North Thornton Road (Signalized)	Entire Intersection	25	C
North Devries Road and North Thornton Road (Stop-Controlled)	Westbound Approach	10	A
North Thornton Road and De Broggi Road (Stop-Controlled)	Eastbound Approach	10	B
West Eight Mile Road and NB I-5 Ramps (Signalized)	Entire Intersection	9	A

AFC Table 5.12-4
Source: LEC 2009A,
*Delay is measured in second/vehicle for the intersection

AIRPORTS

The nearest airport facility is the Kingdon Airpark, a privately owned airport located approximately 1.4 miles east of the LEC project site. Lodi Airpark, also a privately owned airport is located approximately 3.6 miles east of the proposed project site.

PUBLIC TRANSPORTATION

Public transportation in the area is provided by Lodi City Grape Line and the San Joaquin Regional Transit District. The closest routes are approximately two miles away from the project site. Route 93 connects Stockton to Lodi and travels on Eight Mile Road between Thornton Road and Lower Sacramento Road. Route 66 connects Thornton Road to Spanos Park West and goes around the southeast corner of Oak Grove Regional Park.

There are no school bus routes or stops within the routes that would be used by the workforce going to and from the project site or along the truck routes proposed for use during construction of the project.

RAILROADS

The Southern Pacific Railroad (SPRR) and the Central California Traction Company serves the city of Lodi. The Union Pacific Railroad (UPRR) serves the areas west of Lodi, and its tracks are the closest to the project site, which is approximately 2.2 miles east of the project site. The applicant has not indicated in their application the use of the railroad system for delivery of heavy equipment.

BICYCLE ROUTES

The nearest Class III bikeway is located on Devries Road between North Thornton Road and Armstrong Road. A Class III bikeway is considered a rural bike lane generally designated by a white line along the edge of a roadway. Surrounding roadways in the area around the Devries Road bikeway would require major roadway improvements such as widening the road shoulder to accommodate bike lanes. Energy Commission staff observed no bicycle or pedestrian activity in the area of the project site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on traffic and transportation if the project would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; or
- Result in inadequate parking capacity; or conflict with adopted policies, plans, or programs.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

When evaluating a project's potential impact on the local transportation system, staff uses LOS determinations as the foundation on which to base its analysis. The following discussion identifies potential traffic impacts associated with the construction of the LEC and provides an explanation of the impact conclusion.

The Application for Certification (AFC) provides an analysis of projected traffic conditions with the addition of project construction traffic trips. Project construction is expected to take 24 months. All plant construction workers parking and laydown areas will be within existing project site boundaries (LEC 2008a, p. 2-1). (See **Traffic and Transportation Figure 1**) Staff has determined that the on-site parking areas are adequate for the number of construction workers involved in the project.

Construction Workforce Traffic

To determine the amount of vehicle trips to the project site during average and peak construction, the applicant assumed that 20% of the workforce will carpool during the two work shifts. The first shift would start at 6:00 am and end at 2:30 pm. The second shift will start at 2:30 pm and end at 11:00 pm. The average number of construction workers would be approximately 166 (AFC pg. 5.10-13), while the peak workforce would consist of 305 workers in month 16 of the construction period. Considering the worst case scenario, the applicant assumed 142 one-way daily trips during peak construction with carpooling. Given experience with previous projects, staff believes that the estimated construction traffic trips and assumptions about peak construction activity are reasonable. Based on regional demographics and availability of skilled laborers, the construction workers would likely come from Sacramento and San Joaquin County. However, staff believes that some workers could come from the Lodi, Modesto, foothills, and San Francisco and bay areas.

Construction Truck Traffic

Construction of the generating plant would require the use and installation of heavy equipment and associated systems and structures. Heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers, and drilling equipment. A passenger car equivalent (PCE) factor of three cars per truck was used to determine the traffic impacts of trucks and heavy equipment deliveries (National Research Council 1994). Project construction is expected to require three heavy trucks per day during peak construction (LEC 2008a). In-bound and out-bound truck traffic would arrive and depart the project site using the same route as construction workers. Construction access to the project site will be primarily from the following routes:

- From Sacramento and points north: from I-5 exit at the SR 12 interchange, then turn south onto North Thornton Road, east on I-5 Frontage Road, and north on Cord Road which is a private roadway to the project site.
- From Stockton and points south: from I-5 exit (West) Eight Mile Road, proceed west on Eight Mile Road, north on North Thornton Road, east on I-5 Frontage Road, and north on Cord Road which is a private roadway to the project site.

As reflected in **Traffic and Transportation Figure 2**, the applicant has proposed the use of heavy hauls routes (temporary access) which would require an approved encroachment permit from Caltrans. Heavy Haul Route 1 would require the construction of a new temporary access road (approximately 100 feet long) connecting the on-ramp to the southbound lanes of I-5 from eastbound SR12.

Heavy Haul Route 2 would use N. Thornton Road for delivery of heavy equipment and require an encroachment permit from San Joaquin County, and from Caltrans.

Total Construction Traffic

Total average construction traffic impact (workforce and trucks) would be 365 vehicle trips (160 workers one-way trips plus 45 PCE for truck and delivery trips). Total peak construction traffic impact would be 558 vehicle round trips (225 worker trips plus 54 PCE for truck and delivery trips). Staff has recommended a traffic and transportation control plan that will be prepared in coordination with the city of Lodi, San Joaquin County and Caltrans (see Condition of Certification **TRANS-1**). Staff is also proposing Condition of Certification **TRANS-2** to repair any damage to North Cord Road, West Eight Mile Road, De Broggi Road, and North Thornton Road from construction traffic, particularly from heavy trucks.

Traffic and Transportation Table 4 provides the average daily traffic (ADT) volumes with the addition of the project's traffic volumes along the freeway and roadway segments during construction of the proposed project. The forecast is that the freeway and roadways would operate at an acceptable level LOS with the exception of North Thornton Road between West Eight Mile Road and North Devries Road, which degrades from LOS E to LOS F. North Thornton Road between De Broggi Road and SR 12 continues to operate at LOS F.

Traffic and Transportation Table 4
Freeway/Roadway Segment Level of Service Year 2009
Project Construction Conditions

Roadway Segment		Between	Added Vehicles	Percentage of Existing Daily Demand	Daily V/C	LOS
Local Roadway Segments	N. Cord Road	Frontage Road and WPCF access road	284	660%	0.03	A
	W. Eight Mile Road	Interstate 5 at N. Thornton Rd.	86	<1%	0.30	A
	De Broggi Road	North Thornton Road at Star Street	113	19%	0.06	A
	Flag City Boulevard	SR 12 and De Broggi Rd.	28	4%	0.60	A
	Star Street	De Broggi Road and SR 12	85	-	-	-
	North Thornton Road	W. Eight Mile Road and N. Devries Rd.	86	<1%	1.01	F[a,b]
	North Thornton Road	N. Devries Road and Frontage Rd.	86	<1%	0.85	D[a]
	North Thornton Road	Frontage Road and De Broggi Rd.	198	5%	0.33	A
	North Thornton Road	De Broggi Road and SR 12	85	<1%	1.07	F
Freeway Segments	SR 4	Hillcrest Avenue, Antioch and Junction SR 160	56	<1%	0.49	A
	SR 12	Junction SR 160 and junction with I-5	56	<1%	0.59	A
	SR 12	Junction I-5 and Thornton Rd.	170	<1%	0.23	A
	SR 12	Thornton Road and Lower Sacramento Rd.	28	<1%	0.40	A
	SR 160	Junction SR 4 and Sacramento /Contra Costa County Line	56	<1%	0.43	A
	SR 160	Contra Costa/Sacramento County Line and junction Route 12	56	<1%	0.39	A
	Interstate 5	Hammer Lane, Stockton and Eight Mile Road	86	<1%	0.88	D
	Interstate 5	Eight Mile Road and Junction with Route 12	0	0%	0.69	B
	Interstate 5	Junction Route 12 and Peltier Rd.	114	<1%	0.58	A

a Segment already operates at an unacceptable LOS
b Segment LOS degraded
Source: LEC 2009A, page 5.12-17, Table 5.12-6

Traffic and Transportation Table 5 reflects the peak hour intersection LOS and average vehicle delay during project construction conditions. As reflected in Table 5, all study intersections are forecast to operate at LOS C or better during construction conditions.

Traffic and Transportation Table 5
Peak Hour Intersection Level of Service
Project Construction Conditions

Intersection	Movement	Delay	LOS
SR 12 and Flag City Boulevard	Northbound Approach	17	C
West Eight Mile Road and SB I-5 Ramps	Entire Intersection	28	C
SR 12 and SB I-5 On-Ramp	Entire Intersection	9	A
West Eight Mile Road and North Thornton Road	Entire Intersection	26	C
North Devries Road and North Thornton Road	Westbound Approach	10	B
North Thornton Road and De Broggi Road	Eastbound Approach	11	B
West Eight Mile Road and NB I-5 Ramps	Entire Intersection	9	A

AFC Table 5.12-7
Source: LEC 2009A,

Linear Facilities

Natural gas would be provided using a new 12-inch diameter gas line that will connect to Pacific Gas and Electric Company's existing gas transmission line #108 (LEC 2009-Supplement C, p.1). The revised natural gas pipeline would parallel the existing 3-mile pipeline that currently serves the applicant's existing 49-megawatt Combustion Turbine Power Plant No.2, which is adjacent to the proposed LEC project site. The portion of the supply line route proposed to be upgraded is the section between N. Thornton Road and N. Devries Road, and will increase the length of the linear by 1,274 feet. To reduce project impacts on area traffic and to facilitate safety during construction, staff has recommended Condition of Certification **TRANS-1** to ensure traffic control measures are in place.

Process water for the proposed project would be supplied by recycled water from the city of Lodi's Water Pollution Control Facility (WPCF) via an existing 48-inch pipeline in the utility corridor connecting the LEC and the WPCF. Sanitary sewer connections will also be provided through existing connections in this utility corridor to the WPCF. Potable water for sanitary and domestic use will be provided by an onsite well.

The electrical interconnection will be connected to the existing 230-kV switchyard adjacent to the Northern California Power Agency's Combustion Turbine Plant.

Construction Phase Transport of Hazardous Materials and Waste

Deliveries to the LEC site would include small quantities of hazardous materials to be used during project construction. The applicant has stated that the delivery/disposal of hazardous materials (LEC 2008a) to and from the site, and materials handling on site would be conducted in accordance with all applicable federal and state statutes (see the **HAZARDOUS MATERIALS MANAGEMENT** section of this staff assessment for more information). The transportation routes would use the same routes as provided earlier in this analysis for the construction work force.

Operation Impacts and Mitigation

Employee and Truck Traffic

Operation of the power plant would require a labor force of seven full-time employees that would generate 14 one-way trips to and from the LEC site. Other project-related trips (that is, delivery trucks, visitors, and other business-related trips) are expected to be minimal and would occur during regular business hours. Staff assumes that operational workers would follow the same routes as the construction workers. These minor trip additions to surrounding local streets and highways would not significantly affect the LOS of these roads.

Transport of Hazardous Materials and Waste

The transportation and handling of hazardous substances associated with the proposed project could increase roadway hazard potential. Impacts associated with hazardous material transport to the facility could be mitigated to less than significant level by compliance with existing federal and state standards established to regulate the transportation of hazardous substances. The applicant intends to comply with all federal and state regulations related to the transportation of hazardous materials (LEC 2009a, p.5.12-18).

The California Department of Motor Vehicles exclusively licenses all drivers who transport hazardous materials. Drivers are also required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest, which is available for review in the event of a spill, and is reviewed by the California Highway Patrol at inspection stations along major highways and interstates.

The California Vehicle Code and the Streets and Highways Code (sections 31600 through 34510) 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.

Project operation would require use of hazardous substances including sulfuric acid and cleaning and water treatment chemicals. It is estimated that there would be a maximum of six delivery/service trucks per week. Operation would also require a maximum of four

deliveries per month of aqueous ammonia. A licensed hazardous waste transporter would haul any hazardous waste from the project site to one of three Class 1 hazardous waste landfills in western Kern County near the communities of Buttonwillow and Kettleman City, and in Imperial County near the community of Westmoreland. The handling and disposal of hazardous substances are also addressed in the **WASTE MANAGEMENT, WORKER SAFETY AND FIRE PROTECTION,** and **HAZARDOUS MATERIALS** sections of this assessment.

Airport Operations

As noted earlier, the nearest airport facility is the Kingdon Airpark, a privately owned airport located approximately 1.4 miles east of the LEC project site. Lodi Airpark, also a privately owned airport is located approximately 3.6 miles east of the proposed project site.

The existing flight pattern does not bring aircraft at low altitude over the project site. The combustion turbine generator stacks would be 150 feet high and the seven-cell chiller cooling tower would be 43.5 feet high. All new electrical transmission line poles will be approximately 78 feet in height. The applicant conducted a FAR Part 77 Imaginary Surfaces review LEC. The analysis indicated that the HRSG stack falls within the area of the Kingdon Airpark conical surface. At the location of the proposed LEC HRSG stack, the elevation of the conical surface is approximately 281 feet ansl. The LEC HRSG stack will be 150 feet tall with a base elevation of 8.5 feet, so the top of the HRSG stack will be below the conical surface and no FAR Part 77 impacts would occur with the siting of the proposed project at this location.

The California Highway Patrol monitors traffic from the air and would probably remain directly above I-5 and SR 12 and not fly east or west toward the proposed project site. Therefore, the LEC plumes would not affect local aircraft operations. Staff concludes that the proposed project would not cause a significant adverse impact on aircraft operations.

Ground-Level Water Vapor Plumes

Seasonal and Annual Cooling Tower Impact (SACTI) modeling results for the proposed project's cooling tower during operation indicate a very low potential for ground level fogging, as a result of vapor plumes vented from the cooling towers under certain conditions (for example, cold winter days). Ground level fogging would occur with duct firing. In the north-northeast direction, ground hugging plumes are not predicted any further than 1975 feet away from the site. A very small frequency of ground level fogging would reach I-5 (approximately an hour every four years). The very limited occurrence (frequency and duration) of ground level fogging created by the project's cooling towers would generate a less than significant impairment of visibility to motorists on nearby public roads and highways. Please see **APPENDIX VR-2** in the Visual Resources section of the Staff Assessment (SA) for a complete discussion on the ground level water vapor plume.

Emergency Services Vehicle Access

The Woodbridge Fire Protection District would provide 24-hour fire protection and emergency medical services to the LEC site. The nearest fire station is the Woodbridge

Station No.4 at 6365 W. Capitol Avenue in the city of Lodi. The station is approximately 1.8 miles north of the project site and response time is approximately 7 to 10 minutes. Emergency service vehicles would reach the project site via the access road off of North Cord Road. For a more detailed discussion of emergency services concerning adequate ingress/egress serving the facility, see the **WORKER SAFETY AND FIRE PROTECTION** section of this assessment.

CUMULATIVE IMPACTS

A cumulative impact is an impact created as a result of the combination of the proposed project together with other projects causing related impacts. When the proposed project is viewed together with the effects of other projects in the area, cumulative impacts may be significant. A number of projects are proposed for development in the LEC site vicinity (more than 4 miles from the project site) that could contribute to cumulative effects. These include commercial, industrial developments and various housing and mixed uses. Many of these of these projects are some stage of review by the local agencies, and no timeframes for development are known at this time.

It has been determined that the construction of these facilities would not result in a significant cumulative impact to traffic flow during the construction or during the operation of the LEC project because of the distance and timing of the projects. The LEC will implement a traffic control plan, consistent with the County's public works department requirements (see Condition of Certification **TRANS-1**), therefore, cumulative traffic impacts are not considered significant.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its impact analysis. There are no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues due to traffic and transportation.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all applicable LORS (LEC 2008a, section 5.12.5). Staff has concluded that the project as proposed would comply with relevant LORS. **Traffic and Transportation Table 6** presents the project's conformance with all applicable LORS.

Traffic & Transportation Table 6
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal	
Title 14, Code of Federal Regulations (CFR) Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
	Consistent: The nearest airport facility is the Kingdon Airpark, a privately owned airport located approximately 1.4 miles east of the LEC project site. Lodi Airpark, also a privately owned airport is located approximately 3.6 miles east of the proposed project site. The existing flight pattern does not bring aircraft at low altitude over the project site and none of the project's structures would penetrate any navigable airspace.
Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles that operate on public highways.
	Consistent: Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., San Joaquin County Department of Public Works).
State	
California Vehicle Code, Division 2, Chapter 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14.1, Chap. 1 & 2; Div. 14.8; Div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
	Consistent: Enforcement is provided by state and local law enforcement agencies and through ministerial state agency licensing and permitting and/or local agency permitting.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.
	Consistent: Enforcement is provided by state and local law enforcement and through ministerial state agency licensing and permitting and/or local agency permitting.
Local	
City of Lodi General Plan Circulation Element	Requires LOS D or better operating conditions for city intersections and roadways.
	Consistent: As reflected in Traffic and Transportation analysis, one roadway segment (North Thornton Road, between West Eight Mile Road and North Devries Road) is projected to a have a negative change in LOS (E to F) with the addition of construction traffic. To address the construction impact, the applicant will be required to prepare a construction traffic control plan to include methods of reducing construction project impacts on local roadways.

Applicable LORS	Description
San Joaquin County Regional Transportation Plan.	Requires LOS D (V/C<1.0) or better operating conditions for city intersections and roadways.
	Consistent: As reflected in Traffic and Transportation Table 5, the LOS along roadway intersections along the construction designated roadways would remain below the LOS D threshold requirement, therefore will be in compliance with the county's congestion management plan.
County of San Joaquin 2010 General Plan Transportation Element	Requires level of service (LOS) C or better operating conditions for all county roadway links and intersections, except in a sphere of influence where the City has adopted LOS D or better on minor arterials and roadways.
	Consistent with mitigation: The applicant will be required to construction traffic control plan to include methods of reducing construction project impacts on local roadways that exceed LOS on various roadways that are proposed roadways designated for construction routes.

CONCLUSIONS

1. As discussed in this analysis, the project as proposed would comply with all applicable LORS related to traffic and transportation with the exception of one roadway segment (North Thornton Road, between West Eight Mile Road and North Devries Road) is projected to a have a negative change in LOS (E to F) with the addition of construction traffic. Staff has recommended Condition of Certification **TRANS-1** which would require methods to reduce the project's impact at this location, such as staggering the departure of construction workers, and /or establishing carpool/vanpool incentives

2. Because of the project's distance from the nearest airport, no impact on the Kingdon Airpark and Lodi Airpark airspace would occur, and the project would not impact aviation safety, or affect CHP monitoring the area highways by aircraft.

3. Staff is proposing Condition of Certification **TRANS-2** which would require a mitigation plan to repair portions of North Thornton Road and North Cord Road if they are damaged by project-related traffic.

4. There would be no significant direct or cumulative traffic and transportation impact and therefore no environmental justice issues.

PROPOSED CONDITION OF CERTIFICATION

TRANS-1 The project owner shall prepare a construction traffic control and implementation plan for the project and its associated facilities. The project owner shall consult with the affected local jurisdiction(s), City of Lodi, Caltrans and San Joaquin County Public Works Department, in the preparation of the traffic control and implementation plan. The local jurisdiction, Caltrans (if applicable) and San Joaquin County Public Works Department shall have 30 calendar days to review the plan and provide written comments to the project owner.

The project owner shall provide a copy of the local jurisdiction's, and Caltrans written comments and a copy of the traffic control and implementation plan to the CPM.

The traffic control and implementation plan shall include and describe the following minimum requirements:

- Timing of heavy equipment and building materials deliveries and related hauling routes;
- Redirecting construction traffic with a flag person;
- Signing, lighting, and traffic control device placement;
- Timing of construction work hours and arrival/departure intervals outside of peak traffic periods;
- Ensuring safe access to the main entrance;
- Ensuring access for emergency vehicles to the project site;
- Closing of travel lanes on a temporary basis;
- Ensuring access to adjacent commercial land industrial properties during the construction of all linears;
- Devising a construction workforce ridesharing plan; and
- Provide a shuttle service from the most distant off-street parking areas.

The project owner shall submit the proposed traffic control and implementation plan to the affected local jurisdiction, San Joaquin County and Caltrans for review and comment. The project owner shall provide to the CPM a copy of the transmittal letter submitted to the affected local jurisdiction, and Caltrans requesting their review of the traffic control and implementation plan. The project owner shall provide any comment letters to the CPM for review and approval.

Verification: At least 60 days prior to start of site mobilization, the project owner shall provide to the city of Lodi and county of Joaquin, Caltrans, and the California Highway Patrol for review and comment and to the CPM for review and approval, a copy of the construction traffic control plan. The plan must document consultation with these agencies.

TRANS-2 Prior to site mobilization activities, the project owner shall prepare a mitigation plan for Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road. The intent of this plan is to ensure that if these roadways are damaged by project construction, they will be repaired and reconstructed to original or as near original condition as possible. This plan shall include:

- Documentation of the pre-construction condition of Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road. Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape of these roadways.
- Documentation of any portions of Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road that may be inadequate to accommodate oversize or large construction vehicles and identification of necessary remediation measures; and
- Reconstruction of portions of Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road that are damaged by project construction due to oversize or overweight construction vehicles.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road to its pre-project condition to the city of Anaheim Public Works and Planning Department for review and comment and to the CPM for review and approval.

Within 90 days following the completion of construction, the project owner shall provide photo/videotape documentation to the San Joaquin Planning Department and the CPM that the damaged sections of Eight Mile Road, North Thornton Road, I-5 Frontage Road, and Cord Road have been restored to their pre-project condition.

REFERENCES

City of Lodi. 1991. General Plan Circulation Element.

City of Lodi. 2007. Municipal Code

CH2MHILL 2009 d - Supplement C-Natural Gas Supply Line Route Change, dated 03/19/09.

NCPA 2008 a - Application For Certification (AFC) Volumes I and II, dated 09/10/08

Transportation Research Board. 2000. Highway Capacity Manual

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TRAFFIC AND TRANSPORTATION - APPENDIX A

HIGHWAY CAPACITY MANUAL

The *Highway Capacity Manual* is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the *Highway Capacity Manual* (*HCM*) have been published. The current edition was published in 2000. It contains concepts, guidelines, and procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, and rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the *Highway Capacity Manual 2000*. The *Highway Capacity Manual 2000* represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level of service A representing the best operating conditions and level of service F, the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A**.

Table A
Level of Service Description

	Uninterrupted Flow	**Interrupted Flow**
Facility Type	Freeways Multi-Lane Highways Two-Lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-Way Stop Control - All-Way Stop Control
Level of Service		
A	Free-flow.	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow.	Tolerable delay
E	Unstable flow.	Limit of acceptable delay
F	Forced or breakdown flow.	Unacceptable delay

Source: *Highway Capacity Manual 2000*

Interrupted Flow

One of the more important elements limiting, and often interrupting, the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals and stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, driver frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (that is, in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period.

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length, and the volume to capacity ratio for the lane group.

For each intersection analyzed, the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop, causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle, the limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation and arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: *Highway Capacity Manual 2000*

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*. It represents a departure from previous updates. In the third edition of the *Highway Capacity Manual*, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, driver frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (that is, in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections, in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections, the stop-controlled approaches are referred to as the *minor street approaches* and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the *major street approaches*.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay: less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay: greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay: greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay: greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay: greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay: in excess of 50 seconds per vehicle for each movement subject to delay.

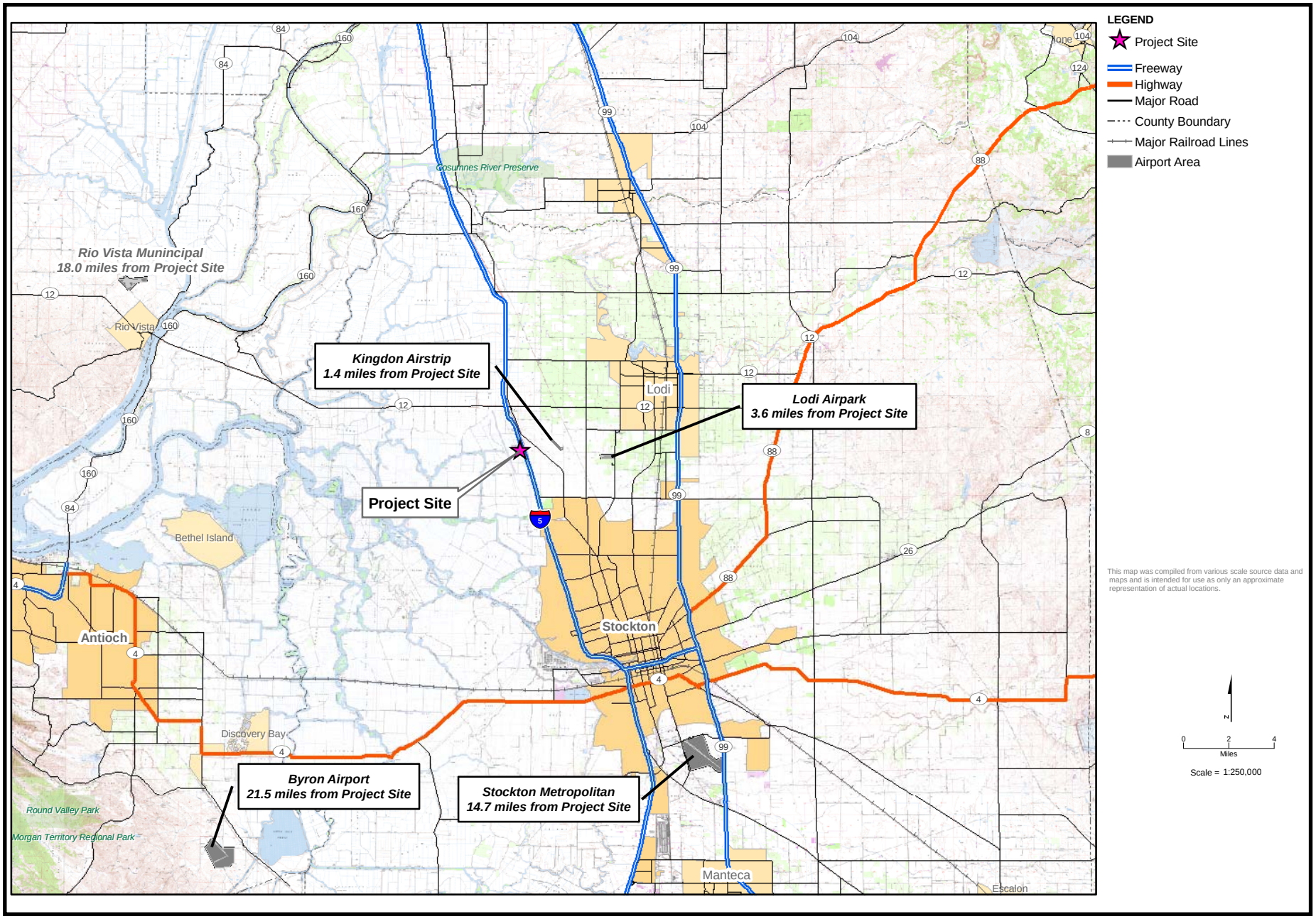
Source: *Highway Capacity Manual 2000*

REFERENCE

Transportation Research Board. *Highway Capacity Manual 2000*. Washington, D.C.

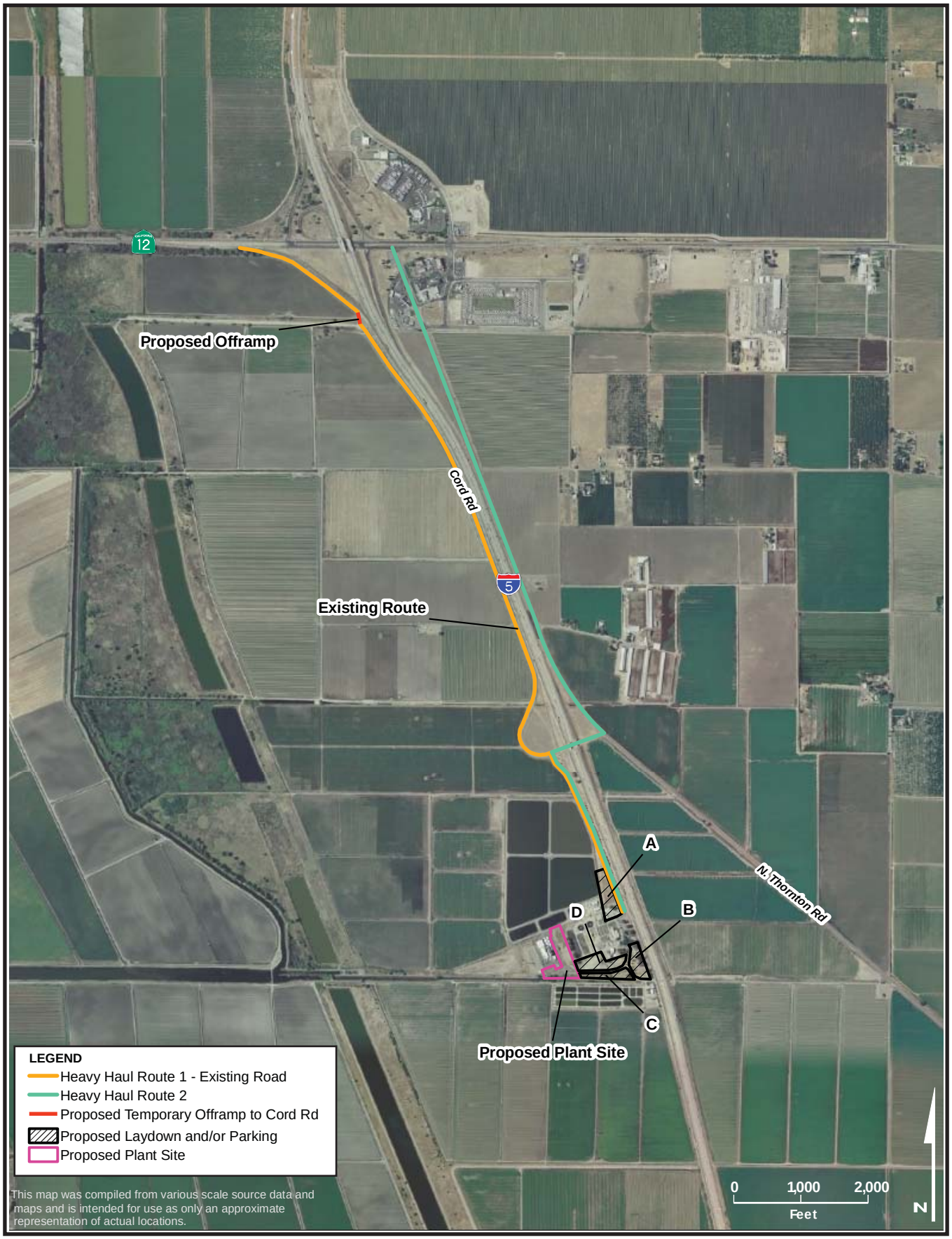
TRAFFIC AND TRANSPORTATION - FIGURE 1

Lodi Energy Center - Regional Transportation Setting



SOURCE: AFC Figure 5.12-1

TRAFFIC AND TRANSPORTATION - FIGURE 2
Lodi Energy Center - Location Transportation Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 5.12-4

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, Northern California Power Agency (NCPA) proposes to transmit the power from the proposed Lodi Energy center (LEC) to the Pacific Gas and Electric (PG&E) transmission grid through a new 500-foot 230-Kilovolt (kV) overhead line extending from LEC to the switchyard of the existing NCPA Combustion Turbine project #2 also known as the Steam Turbine Injection Gas (STIG) plant. It is from this existing switchyard that the generated power would be transmitted to the PG&E power grid. This new connecting line would be located within NCPA property boundaries with no nearby residences meaning that that there would there would be no potential for residential electric and magnetic field exposures that have raised concern about human health effects in recent years. The proposed line would be operated in the PG&E service area and therefore, its design, erection, and maintenance plan would be according to standard PG&E practices, which conform to applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any line-related safety and nuisance impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the proposed line design and operational plan to determine whether its related field and nonfield impacts would constitute a significant environmental hazard in the area around the proposed route. All related health and safety LORS are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

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

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Transmission Line Safety and Nuisance Table 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, " Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
Noise Element of San Joaquin County's Code	Sets noise limits for stationary noise sources.
City of Lodi Municipal Code.	Sets sound level limits at residences and outdoor activity areas.

Applicable LORS	Description
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, “Rules for Overhead Electric Line Construction”	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. “High Voltage Safety Orders”	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93 11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.

Applicable LORS	Description
Fire Hazards	
State	
14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

According to the applicant (NCPA 2008a, pp. 1-1, 2-1, 3-1, and 5.6-1), the site for the proposed project is a 4.4-acre parcel adjacent to the city of Lodi's White Slough Water Pollution Control Facility (WPCF) and the existing NCPA Combustion Turban Project #2 steam turbine injected gas (STIG) plant. The project site was chosen in part for its proximity to this existing STIG plant through whose switchyard the generated power would be transmitted to the PG&E 230-kV power grid. The area is zoned for agricultural use and electricity generation is allowable use. The line would be 500 feet long and located within the facility's property boundaries with the nearest of the three identified area residences located approximately 0.75 miles to the north. This absence of residences in the immediate vicinity means that there would be no long-term residential exposures to the generated electric and magnetic fields.

PROJECT DESCRIPTION

According to the information from the applicant (NCPA 2008a, pp. 3-1 through 3-6), the proposed project transmission line would consist of the segments listed below:

- A 500-foot overhead 230-kV line connecting LEC's to the existing STIG plant's 230-kV switchyard ; and
- LEC's on-site 230 switchyard from which the connecting lines would originate.

The proposed line conductors would be located on monopole supports whose basic structures were presented by the applicant with regard to safety and field control efficiency. Since the line would be connected to the power grid of the area's main service utility (PG&E), its conductors would be standard low-corona aluminum steel reinforced cables typical of such PGE lines. The applied design and construction would be in keeping with PG&E's guidelines that ensure line safety and efficiency together with reliability, and maintainability.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed LORS. These LORS have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-

related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace and the need to file a “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA as noted in the LORS section. 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.

These applicable regulations require FAA notification for construction of structures over 200 feet above ground level. Also, notification is required if the proposed structure is less than 200 feet but falls within the restricted airspace in the approaches to public or military airports and heliports. For airports with runways of 3,200 feet or longer, the restricted airspace would extend 20,000 feet from the runway. For airports with runways of 3, 2000 feet or less, the restricted airspace would extend 10,000 feet. For public or military heliports, the restricted airspace would extend 5,000 feet.

The applicant has identified the Kingdon Airpark and Lodi Airpark as the nearest public airports to LEC. Kingdon Airpark is approximately 1.4 miles from the site and with a runway of 3,750 feet that would potentially place LEC within its restricted airspace. However, the maximum height of the line’s support structures at 78 feet would be much less than the 200-foot threshold of concern to FAA regarding the potential collision hazards, making such collisions unlikely. The applicant has filed the noted Form 7460 with the FAA as required (NCPA 2008a, p 3-8). Since Lodi Airpark is approximately 3.6 miles away and with a runway of less than 3,200 feet, LEC would be beyond its restricted airspace thus, minimizing the potential for aircraft collisions with the line supports. The nearest military airport to LEC and related line is Travis Air Force Base with runways of 10,992 feet and 11,001 feet. However, the nearest point to LEC is 31.9 miles away therefore, placing LEC beyond the restricted airspace of Travis Air Force Base. The nearest heliport to LEC is the AG Spanos Companies Headquarters Heliport, which is a private-use heliport regulated by the California Department of Transportation and for which an FAA notification is not required.

Staff concludes from the noted structural and operational features that the proposed LEC line structures would not pose an obstruction-related aviation hazard to area aircraft as defined using current FAA criteria.

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. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained in keeping with standard PG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345-kV and above, and not for 230-kV lines such as the proposed line. The proposed low-corona designs are used for all PG&E lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Staff does not expect any corona-related radio-frequency interference or related complaints in the general project area with no residences. However, staff recommends Condition of Certification **TLSN-2** which requires mitigation in the unlikely event of complaints. Because the cause of complaints is difficult to predict, it is not possible to specify specific mitigation measures. However, a range of mitigation measures is available to address different causes of line-induced interference with radio communication

Audible Noise

As with radio noise, audible noise is limited through design, construction or maintenance practices established from industry research and experience. These practices are effective without creating significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a 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 lines of less than 345-kV as proposed project line. Research by the Electric Power Research Institute (EPRI 1982) has validated this for lines of all voltage classes by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs that would be used for this line would also minimize field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **NOISE AND VIBRATION** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar PG&E lines would be implemented for the proposed project line (NCPA 2008a p. 3-10). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Moreover, the line would traverse an agricultural area with no trees of sufficient size to pose a contact-related fire hazard. Condition of Certification **TLSN-4** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks 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.

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 specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (NCPA 2008a p. 3-10) 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

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's 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). For the proposed project line, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (NCPA 2008a, p.3-10). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The CPUC, other regulatory agencies, and staff, have evaluated the available evidence and concluded that it does not support the conclusion that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present understanding of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof 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.
- There are measures that can be employed for field reduction, but they 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 investor-owned high-voltage lines) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields below levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It 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 apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, 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 factors 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 effect of such applications would be reflected by ground-level field strengths 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 project line according to existing PG&E field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings did not identify a need for significant changes to existing field management policies. Since there would be no long-term residential field exposures along the proposed route as previously noted, there would not be the types of health concern that has been expressed about such exposures in recent years. 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 the immediate vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

Industrial Standards

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the design of the proposed line to ensure the field strength minimization currently required by the 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 to an optimal level;
2. Reducing the spacing between the conductors to an optimal level;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

The potential lack of residential field exposure from the proposed line's operation means that the only project-related exposure of potential significance is the short-term exposure of workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the immediate vicinity of the line. These types of exposures are short-term and well understood as not significantly related to the health concern.

Since the intensity of the line's fields would reflect the effectiveness of PG&E's field-reducing designs to be applied, their calculated or measured values could be used for comparison with fields of similar PG&E lines. It is the similarity between the fields from such existing lines and any new lines that constitutes the previously noted compliance with present CPUC policy on line field management. Staff recommends Condition of Certification **TLSN-3** for field measurements (at representative points along the proposed route) for the necessary comparison. These field strength values would reflect both the effectiveness of the applied field-reducing measures (and the need for further mitigation), and the potential contribution of LEC to area EMF levels.

CUMULATIVE IMPACTS AND MITIGATION

Since the proposed project transmission line and switchyard would be designed according to applicable field-reducing PGE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for PG&E lines of similar voltage and current-carrying capacity. 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 lines to be interconnected. The utility in this case is PG&E. Since the proposed project line and related switchyard would be designed according to the respective requirements of GO-95, GO-52, GO-131-D, and Title 8, Section 2700 et seq. of the California Code of Regulations, and operated and maintained according to current PG&E 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 AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed Lodi Energy Center.

CONCLUSIONS

Since the proposed transmission line does not pose an aviation hazard according to current FAA structural and operational criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current PG&E 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 and related complaints especially along the proposed route with no nearby residences. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication around the proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed Lodi Energy Center and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for PG&E lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff, and would be located along a route without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, Sections 2700 through 2974 of the California Code of Regulations, and Pacific Gas and Electric's EMF-reduction guidelines.

Verification: At least thirty days before starting construction of the transmission line or related structures and facilities, the project owner shall submit to the Compliance

Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related lines and associated switchyards.

Verification: All reports of line-related complaints shall be summarized for the project-related line and included during the first five years of plant operation in the Annual Compliance Report.

TLSN-3 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity along the proposed route. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed not later than six months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

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

Verification: During the first five years of operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

NCPA (Northern California Power Agency) 2008a. Application for Certification of the Lodi Energy Center, Volumes I and II submitted to the California Energy Commission on September 10, 2008.

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

VISUAL RESOURCES

Testimony of Marie McLean

SUMMARY OF CONCLUSIONS

Staff found that with recommended conditions of certification, the construction and operation of the Lodi Energy Center (LEC), a natural gas-fired, combined-cycle, nominal 296-megawatt (MW) plant to be constructed in Lodi, California, would not result in a significant adverse aesthetic impact according to the California Environmental Quality Act (CEQA) Guidelines.

In addition, as proposed, the LEC would comply with applicable city and county laws, ordinances, regulations, and standards (LORS) as they pertain to aesthetics and protection of sensitive visual resources.

INTRODUCTION

Visual resources consist of the viewable natural and man-made features of the environment. In this section staff evaluates the impacts on visual resources resulting from the construction and operation of the LEC. Staff bases its evaluation on information contained in the California Environmental Quality Act (CEQA) Guidelines, Aesthetics, to determine if the project would:

1. Introduce a significant impact under CEQA.

2. Comply with applicable federal, state, and local LORS pertaining to aesthetics and preservation and protection of sensitive visual resources.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 1 includes information about relevant federal, state, and local laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or the preservation and protection of sensitive visual resources.

Visual Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (PL 109-59; 2005). Expires 2009.	Pertains to sites located on or in vicinity of federally-managed lands. LEC site is not located on federally managed lands or in the vicinity of a recognized National Scenic Byway or All-American Road.
State	
California Streets and Highways Code, Sections 260 through 263 – Scenic Highways	Ensures the protection of highway corridors that reflect the State's natural scenic beauty. The state of California has not formally designated as scenic any of the roads or highways within or adjacent to the project area
Local	
San Joaquin County General Plan 2010, Volume III, Community Development, Section II.E	White Slough Recreation Area is listed as significant resource for recreation. Borrow sites (part of White Slough Wildlife Area) are listed as a regional park.
San Joaquin County General Plan 2010, Chapter IV, Public Facilities; Agricultural Land; Objectives	To minimize the impact on agriculture in the transition of agricultural land to urban development.
San Joaquin County General Plan 2010; Chapter IV, Public Facilities, Recreation, Policy 23	Scenic corridors along recreational travel ways and scenic routes shall be protected from unsightly development.
San Joaquin County General Plan 2010, Chapter VI, Resources; Open Space; Policy 13	Development proposals along scenic routes shall not detract from the visual and recreational experience.
City of Lodi General Plan, Section 10, Urban Design and Cultural Resources Element, Industrial Areas	Goal C: To maintain and enhance the aesthetic quality of major streets and public/civic areas The city shall develop special design standards to upgrade roadways, including SR 12 and SR 99. Such standards shall include provisions for setbacks, signs, landscaping, parking, and upgrading commercial development and screening of visually unattractive commercial and industrial uses. Goal 1: The city shall formulate and adopt guidelines, incentives, and design standards as part of the city's Urban Design Plan for upgrading and enhancing the visual quality of existing industrial areas, including screening of industrial operations visible from public streets, site landscaping, and screening of parking lots.

Applicable LORS	Description
City of Lodi General Plan; Urban Design and Cultural Resources; Rural and Agricultural Lands	The rural and agricultural lands surrounding Lodi constitute an important scenic resource that helps to visually define and enhance the city.
City of Lodi Municipal Code, Title 17, Article 4, Design Guidelines	Design guidelines (site design, architecture, landscaping, signs, parking design) apply to all development within the city.

SETTING

The proposed Lodi Energy Center (LEC) is to be located on a 4.4-acre site in the city of Lodi, one-fourth mile southwest of Interstate 5 (I-5) on North Cord Road. The proposed project site, leased from the city of Lodi, contains a 49 MW steam-injected combustion turbine (STIG) plant owned by the Northern California Power Authority (NCPA) and is located next to the city's White Slough Water Pollution Control Facility (WPFC); White Slough Wildlife Area; and the Woodbridge Ecological Reserve. Primary access to the LEC is North Thornton Road from I-5. Lodi's central city is located about 6 miles northeast on State Highway 99. See **Visual Resources Figure 1**.

Both Interstate 5 and Eight Mile Road have been designated as scenic highways in the *San Joaquin County General Plan 2010* for their agricultural views. Eight Mile Road is located about two miles south of the plant.

NCPA will operate the LEC, which will be jointly owned by 14 local and state entities, including the California Department of Water Resources; Bay Area Rapid Transit (BART), Silicon Valley Power; and the cities of Lodi, Azuza, Modesto, Healdsberg, and Ukiah.[1]

Visually, the primary LEC features to be introduced to the site include:

1. 150-foot high exhaust stack
2. 105-foot high and 150-foot wide heat recovery steam generator (HRSG)
3. 70-foot CTG (combustion turbine generator) inlet air housing
4. 46-foot high and 337-feet long cooling tower
5. 40-foot high and 160-foot wide water treatment building

The setting of the LEC is environmentally unique. The setting is located less than a mile from the southern boundary of the Sacramento-San Joaquin Delta Estuary, which includes the White Slough Wildlife Area and the Woodbridge Ecological Reserve. The

[1] NCPA is a not-for-profit joint powers agency consisting of 17 communities and districts located in Northern and Central California. Membership is open to municipalities, rural electric cooperatives, irrigation districts and other publicly owned entities interested in the purchase, aggregation, scheduling, and management of electrical energy. NCPA currently owns and operates five plants in California.

estuary serves as home to more than 500 species of wildlife and at least 20 endangered species (California Department of Water Resources, nd). See **Visual Resources Figure 2**.

Two popular uses of the estuary, including the White Slough Wildlife Area and the Woodbridge Ecological Reserve, are agriculture and recreation. Consequently, the project site is surrounded by agricultural or recreational land. For example, the site sits amidst agricultural land owned by the city of Lodi. In its *City of Lodi General Plan*, the city of Lodi has identified agricultural lands as an "important scenic resource that helps to visually define and enhance the city." Land immediately surrounding the site is owned by the city of Lodi and leased to local farmers for cultivation and harvesting (City of Lodi White Slough Wastewater Treatment Facility, nd)

The White Slough Wildlife Area offers hunting, fishing, hiking, and wildlife viewing. The wildlife area consists of 880 acres of freshwater marshes and grassland/upland riparian habitat as well as man-made ditches, canals, and borrow ponds. Originally, the land was purchased by the California Department of Water Resources in the 1970s as part of its proposal to construct the Peripheral Canal. The ponds, which comprise a relatively small portion of the land, were created during the construction of Interstate 5. In addition, the Woodbridge Ecological Reserve is located between the White Slough Wildlife Area's Pond 6 and Pond 7. See **Visual Resources Figure 3**.

The ecological reserve is one the most concentrated sites in California for Sandhill Cranes as they follow their migratory route from Oregon, Alaska, and Canada to winter from late September to February in the Central Valley. It is also one of the few areas in the state offering close and reliable viewing of the Sandhill Cranes, a state-listed Threatened Species as well as a Department of Fish and Game Fully Protected Species. In connection with the migration, the city of Lodi holds its Sandhill Crane Festival at the Woodbridge Ecological Reserve

The White Slough Wildlife Area as well as the Woodbridge Ecological Reserve is managed by the California Department of Fish and Game as part of its Lands Program. The area is included on the Delta Protection Commission's Inventory of Recreational Facilities for San Joaquin County and listed as a regional park and a significant resource area for recreation in *San Joaquin County General Plan 2010*.

The California Department of Fish and Game offers drop-in tours of the Woodbridge Ecological Reserve during the first three weekends of each month from April through the end of February except during the time of the Lodi Sandhill Crane Festival, when the number of tours is increased.

ASSESSMENT OF IMPACTS

This section includes information about the following:

1. Method and threshold for determining significance
2. Direct/indirect/induced impacts and mitigation
3. Cumulative impacts and mitigation

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine a project's potentially significant impacts on visual resources, Energy Commission staff reviews the project according to "Guidelines for the Implementation of the *California Environmental Quality Act:* Appendix G, "Environmental Checklist Form, Aesthetics."

Aesthetics is concerned with the quality of the visual experience. In that context, *quality* can be said to depend on the viewers' sensibilities as well as their number, location, activities, and values. Specifically, staff assesses the visual impacts resulting from the construction and operation of power plants by evaluating the project's visual or aesthetic effects on its surroundings. That assessment process involves (1) establishing the project's visual environment, primarily through Key Observation Points (KOPs); (2) assessing the visual resources of those KOPs; and (3) analyzing viewers' responses to those KOPs. [2]

As required by the guidelines, staff determines a project's impact on visual resources by evaluating whether the project would substantially:

1. Adversely affect a scenic vista.

2. Damage scenic resources, including, but not limited to, trees, rock outcroppings; historic buildings within a state scenic highway; or part of a river, stream, or estuary.

3. Degrade the existing visual character or quality of the site and its surroundings.

4. Create a new source of light or glare that would adversely affect day or night views in the area.

The following locations were selected as KOPs:

- KOP1, View from Interstate 5, Southbound, One-Half Mile North of Site
- KOP 2, View from White Slough Wildlife Area, One-Half Mile Northwest of Site
- KOP 3, View from Eight Mile Road, Two Miles Southwest of Site

In preparing its assessment, staff reviewed federal, state, and local laws, ordinances, regulations, and standards. Staff also evaluated the proposed project's visual impact on the existing environmental setting based on key observation points (KOPs). KOPs were selected to represent the most critical locations from which the project would be seen.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Information about direct and indirect impacts and proposed mitigation is included in this section and grouped according to the questions found in the following CEQA Environmental Checklist Form.

[2] Key Observation Points (KOPs) are commonly used in visual analysis. In addition to the Energy Commission, other federal, state, and local agencies use KOPs when analyzing the effects of projects on visual resources. These agencies include the U.S. Department of Interior's Bureau of Land Management; the U.S. Forest Service; and the U.S. Department of Transportation; California Department of Parks and Recreation; and many California city and county planning departments.

Visual Resources Table 2
CEQA Environmental Checklist Form—Aesthetics

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
AESTHETICS —Would the project:				
A. Have a substantial adverse effect on a scenic vista?				X
B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, historic buildings within a state scenic highway, or part of a river, stream, or estuary ?			X	
C. Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
D. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		X		

A. Scenic Vista

"Would the project have a substantial adverse effect on a scenic vista?"

For the purposes of this analysis, a *scenic vista* is defined as a distant view of high pictorial quality perceived through and along a corridor or opening. No scenic vistas exist in the KOP1, KOP2, and KOP3 viewsheds.

B. Scenic Resources

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?"

For the purpose of this analysis, *scenic resources* include a unique water feature such as a waterfall; transitional water such as river mouth ecosystems, lagoons, coastal lakes, and brackish wetlands; or part of a stream, river, or estuary.

San Joaquin County has one officially designated state scenic highway route: the 16-mile segment of I-580, located in southwest San Joaquin County. However, this 16-mile segment of road is not located near the LEC. In addition, no state highways near the

LEC are listed as eligible for designation by the California Department of Transportation (CalTrans) as a state scenic highway (CalTrans 2006).

However, because of their agricultural views, I-5 is listed as a scenic highway in the *San Joaquin County General Plan 2010* as is Eight Mile Road. Interstate 5 is approximately one-fourth mile from the project site and Eight Mile Road, approximately two miles.

In addition, the LEC is situated next to the Sacramento-San Joaquin Delta, an estuary that at its closest point is located about one-half mile from the LEC. The Sacramento-San Joaquin Delta estuary, home to about 500 species of wildlife and 20 endangered species, includes lands used by migratory birds, including snow geese, swans, and the greater and lesser Sandhill Cranes. See **Visual Resources Figure 2.**

The White Slough Wildlife Area is part of the estuary as is the Woodbridge Ecological Reserve. At its closest point the wildlife area is located about one-half mile from the southern boundary of the site. This area is included on the Delta Protection Commission's Inventory of Recreational Facilities for San Joaquin County and is also listed in San Joaquin County's *General Plan 2010* as a significant resource for recreation. The White Slough Recreational Area (borrow ponds) is listed as a regional park. See **Visual Resources Figure 3.**

The NCPA's STIG plant already exists at this location and, along with its transmission lines and towers, is clearly visible from KOP 1, the view from Interstate 5, and KOP 2, the view from the White Slough Recreational Area. Consequently, based on the views from KOP1 and KOP2, the introduction of the LEC to the site will have a less-than-significant impact on scenic resources, including the county-designated scenic highway, I-5, and the Sacramento-San Joaquin Delta estuary.

C. Visual Character or Quality

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

The visual aspects evaluated according to this criterion are organized into two categories, construction impacts and operational impacts. Rod:

Construction Impacts

Information about construction impacts are organized according to project site; construction laydown and parking areas; linears; and conclusion. Information about each topic follows.

Project Site

The LEC will be located on 4.4 acres of a 1,040-acre parcel owned by the city of Lodi. The project site is adjacent to the city of Lodi's White Slough Water Pollution Control Facility to the north; NCPA's STIG plant to the west; the White Slough Recreational Area further west; and the San Joaquin County Mosquito and Vector Control facility to the south. Construction activities for the project are schedule to begin in the first quarter of 2010 and conclude in the first quarter of 2012.

Construction is scheduled to occur between 6 am and 11 pm. According to the applicant, required lighting during nighttime construction would be directed toward the center of the site and shielded to prevent light from straying offsite. In addition, the applicant proposes task-specific construction lighting to the extent practical with worker-safety regulations. Nevertheless, the applicant indicated that at limited times during the 24-month construction period the project site may appear as a brightly lit area to viewers in the surrounding areas. To minimize to the greatest extent possible the impacts of construction lighting on the surrounding areas, staff proposes Condition of Certification **VIS-1.**

Construction Laydown and Parking Area

The project site is located approximately one-fourth mile next to I-5 at its closest point and north of the city's White Slough Water Pollution Control Facility. Interstate 5 is listed as a scenic road in San Joaquin County's General Plan.

Construction laydown and parking areas will be located on four parcels (Area A through Area D) totaling 9.8 acres located within the site boundaries of the White Slough Pollution Control Facility. Two construction laydown and parking areas, Area A and Area B, are located directly west of I-5, which is a San Joaquin County-designated scenic highway. During the construction phase of the project, those two areas will be used to store construction equipment, trucks, and parked vehicles. See **Visual Resources Figure 4.**

Both Area A and Area B are located directly west of a San Joaquin County designated scenic highway. However, because of existing trees that screen Area A and Area B, staff has determined that the areas will not be visible to motorists traveling on the highway.

Linears

Five transmission poles and lines will be installed on the north side of the property to tie into the existing 230-kilovolt (kV) switchyard adjacent to the STIG plant. The new plant will use existing nearby infrastructure and utility corridors to tie into the switchyard as well as for access to cooling water and sewer connections. A new gas pipeline, which will extend beyond the project site, will be constructed below ground. See **Visual Resources Figure 4**.

Installing the poles and lines is a four-step process. Each process lasts approximately one week and consists of (1) drilling holes; (2) setting the poles; (3) pouring concrete; and (4) stringing transmission wire. During this time, construction materials, equipment, trucks, and vehicles will be visible from Interstate 5, but only for the short, four-week period.

Because of the constant movement of crews from one pole to another, the viewer exposure, and viewer sensitivity is low. And the newly-installed transmission lines would visually blend with the existing transmission structures and wires currently used by the existing STIG plant.

During pipeline construction, the ground surface along the proposed alignments would be temporarily disrupted by the presence of construction equipment, excavated piles of dirt, concrete and pavement, and construction personnel and vehicles. Along the construction route, visibility from nearby areas would be of a short duration, as each pipeline segment is generally constructed and installed within a few days, before proceeding to the next segment installation. After construction, the ground surfaces would be restored. The restored ground surfaces and buried pipelines would not create a change to the existing visual condition.

Construction activities would not result in a long-term visual degradation. Overall, the project's construction activities generate a less than significant visual effect.

Operational Impacts

Five KOPs were submitted by the applicant. See **Visual Resources Figure 5** for the location of those KOPs. Two KOPs, KOP 4 and KOP 5, were submitted by the applicant at the request of Energy Commission staff to be used as landscape photos. These photos were not evaluated as KOPs. See **APPENDIX VR-1** for information about the process used to evaluate each KOP.

KOP 1, View from Interstate 5, Southbound, One-Half Mile North

This KOP represents the view motorists traveling southbound on I-5 would see from approximately one-half mile north of the site. According to the California Department of Transportation, an average of 64,000 vehicles passed by this view each day during 2006, the latest year for which statistics were gathered (CalTrans Traffic Operation Program, 2006).

For approximately 4.5 miles, land on both east and west of I-5, from the Route 12 interchange to West Eight Mile Road, is zoned agricultural. Interstate 5 has been designated *scenic* by San Joaquin County as is Eight Mile Road.[3] The existing STIG plant is and the proposed LEC will be located in the center of those two boundaries. Agricultural land continues primarily on the west side of I-5 for 36 miles until I-5 merges with I-580, one of California's Scenic Highways.

The city of Lodi's White Slough Water Pollution Control Facility (WPCF), upgraded in 1992, has been operating at this site since 1966. The city owns more than 1,000 acres of land adjacent to the WPCF and leases at least 900 acres to farmers who plant feed and fodder crops (*City of Lodi White Slough Wastewater Treatment Facility*, nd).

In this view from KOP1, 230 kV and 500 kV transmission lines and accompanying towers as well as the 49 MW STIG plant are clearly visible. Water treatment ponds and farmland, visible in the foreground, provides visual relief from the industrialized character of the power plant and transmission towers and lines.

[3] According to the *San Joaquin County General Plan 2010*, *Volume 1, Resources*, scenic routes were selected to if they (1) led to a recreational area; (2) provided a representative sampling of scenic diversity within the county; exhibited unusual natural or man-made features of interest; provided opportunities to view activities outside the normal routine or most people; provided a route for people to view Delta waterways; and linked two scenic routes or connected with scenic routes of cities or other counties.

For this KOP, the applicant indicated in the visual resources section of the Application for Certification (AFC) that a photograph (Photo C) is included to simulate the view as it would appear with proposed landscaping after five years. However, Photo C was not included with the AFC and landscaping was not proposed.

On January 7, 2009, as part of Data Request Set 1, staff requested the applicant to provide a landscaping plan with vegetative screening to buffer the view from I-5 and the White Slough Wildlife and recreational area as well as a simulation of growth after five years and at maturity.

In its February 5, 2009, response to the request, *Data Response Set 1A,* the applicant indicated that no landscaping plan is being prepared for this site because the (1) city of indicated that no landscaping would be required for this project; and (2) the visual analysis conducted by the applicant indicated no visual impacts in any of the views from KOPs 1, 2, or 3 (from I-5, White Slough, and 8 Mile Road, respectively). As a result, the applicant concluded that (1) no CEQA rationale for developing a landscape plan exists.

This area is noted for its agricultural and recreational character. Interstate 5 is listed in San Joaquin County's *General Plan 2010* as a scenic route as is Eight Mile Road. In addition, Policy 13 of the *San Joaquin County General Plan 2010*, "Resources, Open Space," mandates that development proposals along scenic routes will not detract from the visual and recreational experience. And the *City of Lodi General Plan* as well as its zoning codes include as their goals provisions for screening visually unattractive commercial and industrial uses as well as upgrading and enhancing the visual quality of existing industrial areas, including screening of industrial operations visible from public streets as well as parking lots and site landscaping. See **Visual Resources Table 1**.

To comply with city and county LORS, staff has proposed landscaping for this KOP as a condition of certification. See **Condition of Certification VIS-4** and Footnote 1.

Visual Sensitivity

KOP1 (**Visual Resources Figure 6**) represents the existing view, a view of moderate visual quality. This view, which already includes the STIG plant, will be seen primarily by I-5 freeway travelers as well daily commuters and local residents from both north and south directions.

The STIG plant is located in the middle of a 4.5 mile stretch of agricultural land on either side of I-5 (from the Route 12 interchange to West Eight Mile Road, which is also a county scenic highway) with few visual interruptions. Agricultural land continues primarily on the west side of I-5 for 36 miles until I-5 merges with the West Side Freeway, one of California's scenic highways because of its agricultural character. However, because the STIG plant has been operating at this location since 1996, viewer concern is moderate.

According to the California Department of Transportation, about 64,000 vehicles per day, traveling both north and south, passed by this site in 2006.[4] These travelers have a

[4] According to California Department of Transportation, "2006 All-Traffic Volumes on California State Highway System (CSHS), 2006 is the most current year for traffic volumes.

relatively unobstructed and extended view of the LEC for at least two miles from both north and south directions. Thus, visibility is moderately high. The number of viewers— freeway travelers as well as daily commuters— is high. However, the duration of their view is moderately low. The level of viewer exposure at this KOP is moderate. Visual sensitivity for this KOP is moderate.

Visual Change

Visual Resources Figure 7 is a visual simulation of the proposed project's structures as viewed from KOP1. The project would introduce to the site 11 new structures, including a 150-foot tall exhaust stack; a 105-foot tall heat recovery steam generator (HRSG); and 70-foot tall combustion turbine generator (CTG); 46-foot tall cooling tower; 40-foot tall water treatment building; 40-foot tall raw/fire water storage tank; 40-foot tall storage tank; 35-foot tall steam turbine; and a 35-foot tall combustion turbine.

The contrast resulting from the introduction of the new elements on the site is low. In terms of form, line, and color, the HRSG at 105 feet high and 150 feet in length and its 150-foot tall exhaust stack combined with the 70-foot tall CTG do not stand out from the existing STIG plant and related structures. At this KOP, the LEC dominates the existing STIG plant but is co-dominant with other structures on the site, including the transmission towers.

Mountains and sky are visible from this KOP. However, as a unit, the LEC and the STIG plant do not block a significant portion of either the mountains or sky. Hence, view blockage is moderately low.

The new LEC is somewhat larger in scale than the existing STIG plant, but overall, it is subordinate to the landscape. Consequently, visual change caused by the introduction of the proposed project's structures into the view is considered to be moderately low as a result of low visual contrast, moderate visual scale, and moderately low view blockage.

From this KOP visual sensitivity is moderate, and visual change is moderately low. Those two ratings result in an impact of adverse but less than significant.

KOP 2, View from White Slough Wildlife Area, One-Half Mile Northwest

Visual Resources Figure 8 is a visual simulation of the existing project as viewed from KOP2. This KOP represents a view recreationists would see from Pond 11 of the White Slough Wildlife Area, approximately one mile northwest of the site. However, the wildlife area consists of 13 ponds stretching in a north-south pattern for about three miles. Pond 13 is located approximately one-half mile from the project site. See **Visual Resources Figure 3** for a map of the White Slough Wildlife Area.

The White Slough Wildlife Area, part of the Sacramento-San Joaquin Delta Estuary, is located west of and parallel to I-5. Ponds 9 through 13 are south of Highway 12 and accessed via Thornton Road, the same road used to access the LEC. See **Visual Resources Figure 2** for a map of the Sacramento-San Joaquin Delta Estuary.

The wildlife area consists of 880 acres of freshwater marshes; grassland, upland, and riparian habitat, as well as 13 man-made ditches; canals or borrow ponds. Located between ponds 6 and 7 is the Woodbridge Ecological Reserve.

According to California Watchable Wildlife, an organization comprised of federal and state agencies as well as nonprofit and private organizations, the reserve is one of the most concentrated sites for viewing Sandhill Cranes in California as they follow their migratory route from Oregon, Alaska, and Canada to winter from late September to February in the Central Valley. The Sandhill Crane is a threatened species in California. In addition, more than 30 species of birds may be seen in this area from September through early March.[5]

The California Department of Fish and Game holds tours of the Woodbridge Ecological Reserve during the first three weekends of each month from October to February. The city of Lodi holds its weekend Sandhill Crane Festival each November. During that weekend, the Department of Fish and Game tours vary throughout the weekend and preregistration is required.

The White Slough Wildlife Area is owned by the California Department of Water Resources and managed by the California Department of Fish and Game as part of its Lands Program. The White Slough Wildlife Area is included on the Delta Protection Commission's Inventory of Recreational Facilities for San Joaquin County. The area is listed as a regional part in the *San Joaquin County General Plan 2010*; and the White Slough Recreational Area is listed as a significant recreational source in the same document. The wildlife area is open all year.

For this KOP, the applicant indicated in the visual resources section of the Application for Certification (AFC) that a photograph (Photo C) is included to simulate the view as it would appear with proposed landscaping after five years. However, Photo C was not included with the AFC and landscaping was not proposed.

On January 7, 2009, as part of Data Request Set 1, staff requested the applicant to provide a landscaping plan with vegetative screening to buffer the view from I-5 and the White Slough Wildlife and recreational area as well as a simulation of growth after five years and at maturity.

In the February 5, 2009, response to the request, *Data Response Set 1A,* the applicant indicated that no landscaping plan is being prepared for this site because (1) the city of Lodi indicated that no landscaping would be required for this project; and (2) visual analysis conducted by the applicant indicated no visual impacts in any of the views from KOPs 1, 2, or 3 (from I-5, White Slough, and Eight Mile Road, respectively). As a result, the applicant concluded that no CEQA rationale for developing a landscape plan exists.

Visual Sensitivity

KOP 2 represents a view of moderate visual quality as seen by recreationists from Pond 11, located approximately one-mile from the site. However, the recreational area

[5] California Watchable Wildlife, Isenberg Crane Preserve (a.k.a. Woodbridge Ecological Preserve, Site Number 303; http://www.cawatchablewildlife.org/viewsite.php?site=303&display=q

continues for approximately three-quarter miles south, ending in Pond 13, which is located about one-half mile from the project site. Recreationists typically are sensitive to their surroundings. Because the White Slough Wildlife Area offers various recreational activities including hunting; fishing; bird watching and butterfly-watching; walking; and hiking, viewer concern ranges from moderate to high. Recreationists who are hunting, fishing, or bird watching are generally focused on the immediate environment; walkers and hikers tend to pay attention to their surroundings.

From this KOP visibility is low to high, depending on the recreationist's position on the trail. From Pond 11, visibility is low due to vegetation and brush; from Pond 13, approximately one-half mile from the site, visibility is high due to low-lying grasses and water treatment ponds.

In 2006, according to the Department of Water Resources,12,000 people or 33 people per day visited the White Slough Wildlife Area.[6] However, the figures are estimates because no daily count of visitors is taken. Based on the counts published by the Department of Water Resources, the number of visitors would be moderately low.

However, depending on the season, the numbers of visitors is likely to rise. For example, the Department of Fish and Game hosts tours of the Woodbridge Ecological Reserve, which is located between Pond 6 and 7 of the White Slough Wildlife Area, to celebrate the return of the Sandhill Crane.

Tours are conducted the first three weekends of each month from October through the end of February. According to the Department of Fish and Game, two tours, which generally accommodate 25 to 30 people, are held each weekend (California Department of Fish and Game, 2008). Assuming 25 people toured the Woodbridge Ecological Reserve from October through February, approximately 500 people would tour the area in addition to the approximately 1,200 people (2007 estimate) who visit the area for the city of Lodi's annual Sandhill Crane Festival (Lodinews.com, 2009). This year the Sandhill Crane Festival will be held from November 6 through 9. Consequently, the number of yearly viewers could rise to approximately 13,600 or 37 people per day. For this area, however, the number of visitors would remain in the moderately low category.

The duration of view from the wildlife area could range from high to low depending on the point on the trail and the activity in which the recreationists are engaged. Pond 9 is located about two miles from the project site; Pond 13, about one-half mile. Walkers and hikers are likely to have a high duration of view simply because they are likely to be more aware of their surroundings, even stopping to look around. The view of other recreationists—people fishing, bird watching, or hunting—would be low.

From this KOP as well as from Pond 13 overall viewer sensitivity is moderate

[6] *Management of the California State Water Project*, Bulletin 132-06, December 2007; California Department of Water Resources, p. 229.

Visual Change

Visual Resources Figure 9 is a visual simulation of the proposed project's structures as seen from KOP 2. The project would introduce to the site 11 new structures, including a 150-foot tall exhaust stack; a 105-foot tall heat recovery steam generator (HRSG); and 70-foot tall combustion turbine generator (CTG); 46-foot tall cooling tower; 40-foot tall water treatment building; 40-foot tall raw/fire water storage tank; 40-foot tall storage tank; 35-foot tall steam turbine; and a 35-foot tall combustion turbine.

From this KOP, which is located approximately one mile from the site, the LEC blends into the landscape and with the existing structures: the line of the new 150-foot exhaust stack blends in with the lines of the telephone poles and transmission towers; and the 105-foot HRSG blends in with the boxy buildings located on the site. In addition, the project's structures are obscured from view by vegetation and trees. It can be seen but does not attract attention. Consequently, at this KOP, contrast is low in terms of form, line, and color.

In addition, at this KOP, the LEC appears to be co-dominant with the existing STIG plant. As a result, view blockage from this KOP is low. From this KOP the new LEC blends into this highly industrial view, with telephone poles and transmission towers as well as the existing STIG plant and related buildings. In addition, the LEC does not add sufficient mass and form to block views. Consequently, from this KOP visual change would be low as a result of low visual contrast, low visual dominance, and low view blockage.

From KOP 2 visual sensitivity is moderate; visual change is low. Those two ratings result in a visual impact of adverse but not significant.

However, at Pond 13, which is about one-half mile from the site, viewers, particularly walkers and hikers, would have a clear view of the new project. The 150-foot exhaust stack and the 105-foot heat recovery steam generator would be particularly noticeable because of their size. From this position, they clearly overwhelm the existing STIG plant and related buildings.

As a result, from Pond 13, the LEC would appear dominant. The structure's geometric form and prominent horizontal and vertical lines would contrast with the form and lines of the existing STIG plant as well as the flat, agricultural lands and water treatment ponds. In addition, introduction of the LEC to the site blocks a portion of views. As a result, visual dominance would be high; visual contrast would be high; and view blockage, moderate. Consequently, visual sensitivity is moderate. Visual change is moderately high. Those two ratings result in a visual impact of adverse but less than significant.

KOP 3, View from Eight Mile Road, Two Miles Northwest

Visual Resources Figure 10 is a visual simulation of the view of the existing project from Eight Mile Road, looking toward the project site from approximately two miles south of the site. Eight Mile Road is listed as a Scenic Route by San Joaquin County for its agricultural views.

This KOP was selected to represent the views of drivers and residents entering and exiting Spanos Park, the residential subdivision located on the south side of Eight Mile Road. This view also represents that seen by travelers to various recreational areas, including the White Slough Recreational Area and Oak Grove Regional Park. Construction began on Spanos Park in the late 1990s. When completed, Spanos Park will consist of 2,800 single-family homes situated on 3,000 acres.

For this KOP, the applicant indicated in the visual resources section of the Application for Certification (AFC) that a photograph (Photo C) is included to simulate the view as it would appear with proposed landscaping after five years. However, Photo C was not included with the AFC and landscaping was not proposed.

Visual Sensitivity

KOP 3 represents a view of moderately low visual quality. Photographed about two miles from the LEC site, this view is seen primarily by local residents and visitors traveling to and from housing developments and various recreational areas located nearby. Agricultural use of the land is combined with industrial uses: transmission towers and lines extend from the south side of Eight Mile Road, which is identified as a scenic highway in the San Joaquin County General Plan, to the LEC site and coexist with the agricultural plantings.

In this KOP, the field in which the corn is planted, approximately one quarter mile long, is in production at least six months out of the year. When fully grown, corn is approximately six-feet to seven-feet tall (CH2MHill, March 24, 2009).

Residential and recreational viewers are generally sensitive to the environment. However, the STIG plant and transmission lines were in existence before the housing development was constructed. Hence, the views are familiar to both recreational and residential driver.

Viewer concern is moderately low to moderate for both residents and travelers. From this KOP transmission towers and lines, which coexist with agricultural plantings, dominate the view. Those transmission towers and lines combined with the agricultural use of the land adjoining Eight Mile Road renders the visibility of the LEC site moderately low from this KOP.

The number of viewers from this KOP is moderately high. However, the duration of view is moderately low. The view is seen primarily by drivers and passengers either going back and forth to their residences or to recreational areas located nearby. As a result, motorists are more interested in getting to their destination rather than focusing on the views. Instead, they are focused on the road ahead of them.

From this KOP visual sensitivity is moderate as a result of the moderately low visual quality, moderately low to moderate viewer concern, and moderate viewer exposure.

Visual Change

Visual Resources Figure 11 represents a simulated view of the proposed project's visible structures. From this KOP contrast of the proposed LEC with the existing STIG plant is low. In terms of form, line, and color, the LEC blends with the existing STIG

plant. The most noticeable addition to the site, the 150-foot tall exhaust stack blends with the transmission towers that stretch across most of the background in this KOP.

Dominance of the proposed LEC in this KOP is low. The project is located two miles north of this KOP. Consequently, in this KOP grass dominates the foreground; crops dominate the midground; and the background is dominated by trees and transmission towers. When the fields are fallow, about six months during the year, residents and travelers would have a less obstructed view of the project. However, the STIG plant and related transmission towers and wires were in existence before the housing development was built. That fact, combined with the distance of the LEC and transmission lines and towers from the viewers—about two miles—would result in a dominance rating of low to moderately low.

Because the project is located about two miles north of this KOP, it appears subordinate to other elements in the background, including the transmission towers and trees.

Overall, visual change caused by the introduction of the proposed project's structures into the view is considered to be low as a result of low visual contrast, low visual scale, and low visual blockage. The combination of moderate visual sensitivity and low visual change results in an impact of less than significant.

Energy Commission staff notes that Eight Mile Road is listed as a scenic highway in the San Joaquin County General Plant. However, staff did not propose landscaping for KOP 3 because of the distance from KOP3 and Eight Mile Road and the agricultural land located directly north of Eight Mile Road. Both the distance and the agricultural land, which is planted most of the year, help to block the views of the LEC from this KOP.

Linears

Five new 75-foot transmission poles will be placed on the LEC's eastern boundary. The poles are shorter than the existing transmission line corridors already existing on the site. These lines will tie into the existing 230kV located west of the project site, adjacent to the STIG plant.

Other linears include a gas pipeline as well as pipelines for sewer and recycled water. The gas pipeline will be constructed underground and will connect the LEC to PG&E's high-pressure natural gas pipeline located 2.5 miles east of the project site. The sewer and recycled-water pipelines will be provided through a utility corridor that links the power plant and the WPCF.

The construction activities would create a temporary visual disturbance along Frontage Road and I-5. No long-term impacts would occur as a result of the construction of the pipeline and transmission line. Information about temporary impacts from construction activities may be found at the beginning of this section in "Construction Impacts." No visual impacts are anticipated.

Publicly Visible Water Vapor Plumes

The original *Application for Certification, Lodi Energy Center, September 2008*, contained information about the occurrence of publicly visible water vapor plumes.

Energy Commission staff expressed concerns about the applicant's lack of any proposed methods to abate visible plumes from the cooling tower.

On July 27, 2009, the applicant submitted *Application for Certification, Supplement D*. In that supplement, the applicant indicated an equipment change from Siemens combustion turbine generators (CTG) to General Electric Energy CTGs. Accordingly, the applicant submitted a revised plume fogging frequency curve. After reviewing that curve, staff determined that (1) the curve could only represent a plume abated cooling tower; and (2) the tower would result in minimal plume formation and less than significant visible plume frequencies.

A comparison of the original plume fogging frequency curve, staff's modeling results, and fogging frequency curves for other selected projects with non-abated and plume-abated cooling tower designs is provided in **Visible Plume Figure 1**, which may be found in **APPENDIX VR-2.**

However, to ensure that the operation of the LEC will not result in significant visible water vapor plumes, staff is recommending Condition of Certification **VIS-3** to ensure that the cooling tower operation does not create visible plumes that could result in (1) a significant impact on visual quality; that is, substantially degrade the existing visual character or quality of the site and its surroundings; and (2) plume ground-fogging events that would create significant traffic safety impacts on I-5.

See **APPENDIX VR-2,** Visible Plume Modeling Analysis; and Condition of Certification, **VIS-3.**

D. Light or Glare

"Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

During operation, the proposed project has the potential to introduce new nighttime light to the property because of safety and security needs. In spite off switches and motion detectors, non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed, the applicant states that (1) light from the operation of the existing STIG plant and the WPCF would be visible; (2) some additional night lighting will be required by the LEC for operational safety and security; and (3) the project stack and open site areas will be the source of additional visible light.

To minimize to the greatest extent possible the impacts of operational lighting on the surrounding areas, staff proposes Condition of Certification **VIS-4**. To help ensure that power plant structures would not be a source of substantial glare that could adversely affect daytime views, staff proposes Condition of Certification **VIS-5**. With these two conditions of certification in place, staff believes that the LEC would not result in a substantial new source of light and glare that could adversely affect daytime and nighttime views.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts occur when more than one project exists or is planned to be completed or constructed in the same area at the same time. That is, any one project may not create a significant visual impact; but the combination of the new project with all existing or planned projects in the area may result in a significant cumulative impact. See Title 13, *California Code of Regulations*, Section 15355, California Environmental Quality Act.

When conducting a visual analysis, staff must assess cumulative impacts. A finding of a significant cumulative impact would depend on the degree to which (1) the view shed is altered; (2) view of a scenic resource is impaired; or (3) visual quality is diminished. Staff has organized its assessments of cumulative impacts into two categories, Lighting and Current Development Projects.

LIGHTING

As indicated in this analysis, the site already contains an existing STIG plant. According to the applicant, the existing STIG plant and the water pollution control facility together create an area in view of the project site within which some lighting may be visible. During the 24-month construction period for the LEC, construction is scheduled to occur between 6 am and 11 pm. According to the applicant, during this time, brief periods may exist when the project site appears as a brightly lit area in the surrounding area.

Staff has recommended Condition of Certification **VIS-1**, which requires modifications to the brightness, shielding, direction, and use of lighting. However, according to the applicant, this condition may occur even though lights will be shielded and directed toward the center of the construction site to prevent light from straying off-site. Because these periods will be limited, staff concludes that the cumulative impact will be less than significant.

CURRENT DEVELOPMENT PROJECTS

According to the AFC, 21 residential, office, mixed use, institutional, commercial, and industrial projects were in various stages of progress in the city of Lodi in July 2008. All projects are located more than four miles from the proposed LEC, except for the improvements at the White Slough WPCF (Draft EIR issued March 28, 2008), which is adjacent to the project site (LEC AFC, 2009b). Staff notes that according to the City of Lodi Public Works Department, the improvements to the White Slough Water Pollution Control facility, scheduled to begin in 2010 and last between 18 to 24 months, are being done to accommodate the increased water flow needed by the LEC.

In July 2008, 72 projects were processed with the San Joaquin County Building Department. These projects are located in Acampo, Escalon, Farmington, French Camp, Linden, Lockeford, Manteca, Ripon, Stockton, and Tracy. The types of projects included new residential projects, additions, and remodels to existing residences, mobile home renovations, pool construction, administration buildings, barns, a riding arena, storage buildings, warehouses, office building conversions, and institutional projects such as classroom relocation and facilities to house animals (LEC AFC, 2009b).

The visual effects of the proposed LEC in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable because the projects are not in the same viewshed as the LEC. Therefore, cumulative impacts would be less than significant.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

California *Government Code*, Section 65300, requires each city and county in California to adopt a general plan for the physical development of the county or city and any land outside its boundaries that bears relation to its planning. On the basis of these general plans, cities and counties establish policies and strategies necessary to carry out elements of the plan.

Both San Joaquin County and the city of Lodi have adopted a general plan—San Joaquin County in 1992 and the city of Lodi in 1991. **Visual Resources Table 3**, which follows, includes a description of these policies and strategies—laws, ordinances, regulations, and standards—as they pertain to the LEC as well as staff's proposed four conditions of certification to help ensure the LEC's conformance with them.

Visual Resources Table 3
Lodi Energy Center's Consistency
With Visual Resources LORS

LORS		Determination of Consistency	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
San Joaquin County General Plan 2010, Resources; Open Space, Policy 13	Development proposals along scenic routes shall not detract from the visual and recreational experience	YES AS CONDITIONED	
San Joaquin County General Plan 2010; Public Facilities; Recreation, Policy 23	Scenic corridors along recreational travel ways and scenic routes shall be protected from unsightly development.	YES AS CONDITIONED	
Lodi General Plan, Section 10, Urban Design and Cultural Resources Element, Industrial Areas	Goal C: To maintain and enhance the aesthetic quality of major streets and public/civic areas.	YES AS CONDITIONED	To comply with both the city's and county's LORS regarding the preservation of scenic views of selected highways, corridors, and recreational areas; enhancement of the aesthetic quality of major streets and public/civic areas; and upgrading and enhancement of industrial areas, staff has proposed conditions. See **VIS-2, VIS-3**, and **VIS-4** in "Proposed Conditions of Certification" in this document.
	The city shall develop special design standards to upgrade roadways, including SR 12 and SR 99. Such standards shall include provisions for setbacks, signs, landscaping, parking, and upgrading commercial development and screening of visually unattractive commercial and industrial uses.	YES AS CONDITIONED	
Lodi General Plan Section 10, Urban Design and Cultural Resources Element, Industrial Areas (Continued)	Goal I: The City shall formulate and adopt guidelines, incentives, and design standards as part of the City's Urban Design Plan for upgrading and enhancing the visual quality of existing industrial areas, including screening of industrial operations visible from public streets, site landscaping, and screening of parking lots.	YES AS CONDITIONED	

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments pertaining to visual resources have been received.

CONCLUSION

In this visual analysis, staff focused on two primary questions: (1) Would construction and operation of the LEC result in an aesthetic impact according to CEQA; and (2)

Would the project comply with applicable laws, ordinances, regulations, and statutes pertaining to aesthetics or preservation and protection of sensitive visual resources.

Staff concludes that with all proposed and recommended four conditions of certification, potential project-specific visual impacts of the LEC could be mitigated to acceptable, less-than-significant levels and would comply with applicable laws, ordinances, regulations, and statutes pertaining to aesthetics or preservation and protection of sensitive resources.

With the implementation of the proposed and recommended conditions of certification, **VIS-1**, **VIS-3**, **VIS-4**, and **VIS 5,** the LEC would not:

1. Degrade the existing visual character or quality of the resource or the site and its surroundings

2. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

In addition, staff finds that with the implementation of the recommended conditions of certification **VIS-2**, the LEC would comply with applicable aesthetics-related LORS.

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, including any security related boundaries).

c. Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use.

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 requires modifications to the lighting, 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 the CPM with a complaint resolution form report as specified in the General Conditions section including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be included in the subsequent Monthly Compliance Report.

LANDSCAPE SCREENING

VIS-2 To screen the project from Interstate 5 and the White Slough Recreational Area, the project owner shall provide landscaping that reduces the visibility of the power plant structures and complies with local policies and ordinances. Trees and other vegetation consisting of informal groupings of fast-growing evergreens shall be strategically placed and of sufficient density and height to effectively blend in with any existing landscaping as well as screen the power plant structures within the shortest feasible time.

The landscaping shall comply with ordinances of the County of San Joaquin Community Development Department and the City of Lodi Community Development Department pertaining to preservation of scenic views of selected highways, corridors, and recreational areas; enhancement of the aesthetic quality of major streets and public/civic areas; and upgrading and enhancement of industrial areas.

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 [specify local agency] 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 County of San Joaquin Community Development Department and the City of Lodi Community Development Department for review and comment at least 60 days prior to installing the landscaping.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and County of San Joaquin Community Development Department and the City of Lodi Community Development Department 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 prior to the start of commercial operation. The project owner shall simultaneously notify the CPM and County of San Joaquin Community Development Department and the City of Lodi Community Development Department within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

PLUME FORMATION

VIS-3 The project owner shall ensure that the cooling tower is designed and operated as presented to the Energy Commission during the licensing of the Lodi Energy Center Power Plant Project.

Verification: The cooling tower shall be designed and operated to meet the plume fogging frequency curve provided to staff as Figure 3.13-1 in Supplement D, submitted to the Energy Commission on July 27, 2009.

At least 90 days prior to ordering the cooling tower, the project owner shall provide to the CPM for review the final design specifications of the cooling tower to confirm that the fogging frequency curve for the cooling tower cells matches Figure 3.13-1 of Supplement D. The project owner shall not order the cooling tower until notified by the CPM that this design requirement has been satisfied.

The project owner shall provide the CPM written documentation demonstrating that the cooling tower has consistently been operated to meet above-specified fogging frequency curve (except as necessary to prevent damage to the cooling tower) in the project's Annual Compliance Report and at anytime as requested by the CPM. If requested by the CPM, the project owner shall provide the requested cooling tower operating data to the CPM at a date determined by the CPM.

If determined that the cooling tower has not operated within the specified design parameters, the project owner shall provide proposed remedial actions for CPM review and approval.

PERMANENT EXTERIOR LIGHTING

VIS-4 To the extent feasible, 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, including any off-site security buffer areas; (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 city of Lodi Community Development Department and San Joaquin County Community Development Department for review and comment a lighting mitigation plan that includes the following:

a. Location and direction of light fixtures shall take the lighting mitigation requirements into account.

b. Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements.

c. Lighting 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.

f. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches; timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to city of Lodi Community Development Department and San Joaquin County Community Development Department for review and comment a lighting mitigation plan.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not order any exterior lighting until receiving CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been 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 the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days.

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-5 The project owner shall treat the surfaces of all project structures and buildings on site, including those of the existing power plant, visible to the public such that (a) their colors minimize 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. The transmission line conductors shall be nonspecular and nonreflective; and the insulators shall be nonreflective and nonrefractive.

The project owner shall submit for CPM review and approval, a specific surface treatment plan that will satisfy these requirements. The treatment plan shall include:

a. Description of the overall rationale for the proposed surface treatment, including the selection of the proposed colors and finishes

b. 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 as well as those of the existing on-site power plant, from Key Observation Points 1 and 2 (locations shown on Figure 1 of the Preliminary Staff Assessment)

e. Specific schedule for completion of the treatment

f. Procedure to ensure proper treatment maintenance for the life of the project

Verification: 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.

At least 90 days prior to specifying to the vendor the colors and finishes 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 Lodi Community Development Department and San Joaquin County Community Development 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 revisions for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

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 electronic color photographs 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.

REFERENCES

California Delta Protection Commission, Inventory of Recreational Areas; http://ww.delta.ca.gov/recreation/inventory/desc_sj.asp

California Department of Fish and Game, Sandhill Crane Tours; http://www.dfg.ca.gov/regions/3/cranetour

California Department of Transportation, “2006 All-Traffic Volumes on California State Highway System (CSHS)”; http://traffic-counts.dot.ca.gov/2006all.htm

California Department of Water Resources, Bay-Delta Office, *Delta Atlas*; http://baydeltaoffice.water.ca.gov/DeltaAtlas/index.cfm

California Department of Water Resources; *State Water Project—Delta*; http://public affairs.water.ca.gov/swp/delta.cfm.

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County of San Joaquin County, California; *Countywide General Plan 2010;* adopted by San Joaquin County Board of Supervisors, July 29, 1992.

Lodinews.com; Annual Sandhill Festival; lodinews.com; http://www.lodinews.com/specialsections/2007/discover/outdoors2_sandhill.php.

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APPENDIX VR-1

ENERGY COMMISSION VISUAL RESOURCE ANALYSIS EVALUATION CRITERIA

Energy Commission staff conducts a visual resource analysis according to Appendix G, "Environmental Checklist Form—Aesthetics," California Environmental Quality Act (CEQA). The CEQA analysis requires that commission staff make a determination of impact ranging from "Adverse and Significant" to "Not Significant."

Staff's analysis is based on Key Observation Points or KOPs. KOPs are photographs of locations within the project area that are highly visible to the public—for example, travel routes; recreational and residential areas; and bodies of water as well as other scenic and historic resources.

Those photographs are taken to indicate existing conditions without the project and then modified to include a simulation of the project. Consequently, staff has a visual representation of the viewshed before and after a project is introduced and makes its analysis accordingly. Information about that analytical process follows.

VISUAL RESOURCE ANALYSIS WITHOUT PROJECT

When analyzing KOPs of existing conditions without the project, staff considers the following conditions: visual quality, viewer concern, visibility, number of viewers, duration of view. Those conditions are then factored into an overall rating of viewer exposure and viewer sensitivity. Information about each condition and rating follows.

Visual Quality

An expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. Visual quality is rated from *high* to *low*. A high rating is generally reserved for landscapes viewers might describe as picture-perfect.

Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are free from encroaching elements, thus retaining their visual integrity. Finally, landscapes with high visual quality are visually coherent and harmonious when each element is considered as part of the whole. On the contrary, landscapes rated *low* are often dominated by visually discordant human alterations.

Viewer Concern

Viewer concern represents the reaction of a viewer to visible changes in the viewshed — an area of land visible from a fixed vantage point. For example, viewers have a high expectation for views formally designated as a scenic area or travel corridor as well as for recreational and residential areas. Viewers generally expect that those views will be preserved. Travelers on highways and roads, including those in agricultural areas, are generally considered to have moderate viewer concerns and expectations.

However, viewers tend to have low-to-moderate viewer concern when viewing commercial buildings. And industrial uses typically have the lowest viewer concern. Regardless, the level of concern could be lower if the existing landscape contains discordant elements. In addition, some areas of lower visual quality and degraded visual character may contain particular views of substantially higher visual quality or interest to the public.

Visibility

Visibility is a measure of how well an object can be seen. Visibility depends on the angle or direction of views; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. In that sense, visibility is determined by considering any and all obstructions that may be in the sightline—trees and other vegetation; buildings; transmission poles or towers; general air quality conditions such as haze; and general weather conditions such as fog.

Number of Viewers

Number of viewers is a measure of the number of viewers per day who would have a view of the proposed project. *Number of viewers* is organized into the following categories: residential according to the number of residences; motorist according to the number of vehicles; and recreationists.

Duration of View

Duration of view is the amount of time to view the site. For example, a high or extended view of a project site is one reached across a distance in two minutes or longer. In contrast, a low or brief duration of view is reached in a short amount of time—generally less than ten seconds.

Viewer Exposure

Viewer exposure is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is comprised of three elements previous listed, *visual quality*, *viewer concern*, and *viewer exposure*. Viewer sensitivity tends to be higher for homeowners or people driving for pleasure or engaged in recreational activities and lower for people driving to and from work or as part of their work.

VISUAL RESOURCE ANALYSIS WITH PROJECT

Visual resource analyses with photographic simulations of the project involve the elements of contrast, dominance, view blockage, and visual change. Information about each element follows.

Contrast

Contrast concerns the degree to which a project's visual characteristics or elements — form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of a proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent.[7] Generally, visual absorption is inversely proportional to visual contrast.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the field; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view.

A feature's level of dominance is lower in a panoramic setting than in an enclosed setting with a focus on the feature itself. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *low* to *high*.

View Blockage

The extent to which any previously visible landscape features are blocked from view constitutes view disruption. The view is also disrupted when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be disrupted by lower quality project features, thus resulting in adverse visual impacts. The degree of view disruption can range from *none* too *high*.

Visual Change

Visual change is a function of *contrast*, *dominance*, and *view disruption*. Generally, *contrast* and *dominance* contribute more to the degree of visual change than does *view disruption*.

[7] Typically, the Energy Commission does not consider texture in its visual analyses.

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APPENDIX VR-2
VISUAL PLUME MODELING ANALYSIS

Testimony of William Walters

Staff conducted an assessment of the Lodi Energy Center Project gas turbine heat recovery steam generator (HRSG) and cooling tower exhaust stacks to determine visible plumes. As part of the assessment, staff completed a modeling analysis for the applicant's proposed unabated gas turbine/HRSG and cooling tower designs.

PROJECT DESCRIPTION

The applicant has proposed one Rapid Response Siemens SCC6-5000Fcombustion turbine-generator (CTG)/HRSG with no duct burners. The proposed gas turbine design includes inlet air evaporative coolers. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhaust.

For project cooling the applicant has proposed a seven-cell mechanical-draft cooling tower with dual speed fans. The cooling tower has a linear (one by seven) design oriented in an east to west direction. The applicant has not officially proposed to use any methods to abate visible plumes from the cooling tower. However, the plume fogging frequency curve provided by the applicant in their July 27, 2009 Supplement D (Figure 3.13.1) would have to represent a plume-abated cooling tower design.

Additionally, a small auxiliary boiler (36.5 MMBtu/hr) is proposed for this project. However, due to the small size and somewhat limited operation (equivalent to 4,000 hours per year) of the auxiliary boiler, it would have a plume frequency that could be below staff's initial significance criteria and more importantly would have plume sizes that would not be considered visually significant.

VISIBLE PLUME MODELING METHODS

This section is organized as follows: Plume Frequency and Dimension Modeling and Cloud Cover Data Analysis Method.

PLUME FREQUENCY AND DIMENSION MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate plume frequency for the HRSG and plume frequency and plume size for the cooling tower exhaust. This model provides conservative estimates of both plume frequency and plume size. This model utilizes hourly HRSG and cooling tower exhaust parameters and hourly ambient condition data to determine the plume frequency. This model is based on the algorithms of the Industrial Source Complex model (Version 2), used to determine conditions at the plume centerline, but this model does not incorporate building downwash.

The modeling method combines the cooling tower cell 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.

The Seasonal/Annual Cooling Tower Impacts (SACTI) model was used to determine frequency and direction of potential plume ground-fogging events that could impact traffic safety, in this case Interstate 5, located approximately 400 meters east of the project site.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20 percent of seasonal (November through April) daylight, no rain/fog high visual contrast ("clear") hours is used to determine potential plume impact significance. The methodology used to determine high visual contrast hours follows:

- Energy Commission staff 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 used in the analysis categorizes total sky cover and opaque sky cover in 10 percent increments. [8] Staff has included in the "clear" category the following:
    1. All hours with total sky cover equal to or less than 10 percent
    2. Half of the hours with total sky cover 20-100 percent that have sky opacity equal to or less than 50 percent
- The rationale for including these two components in this category is as follows:
    1. Plumes typically contrast most with sky under clear conditions and when total sky cover is equal to or less than 10 percent. Clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear.
    2. For a substantial portion of the time when total sky cover is 20 to100 percent and the opacity of sky cover is relatively low (equal to or less than 50 percent), clouds do not substantially reduce contrast with plumes. Consequently, staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered to be high visual contrast hours and are included in the "clear" sky definition.

If staff determines that the seasonal daylight clear hour plume frequency is greater than 20 percent, plume dimensions are calculated and a significance analysis of the plumes is included in the Visual Resources section of the staff assessment.

[8] This analysis uses a four year Sacramento Hourly United States Weather Observation (HUSWO) meteorological data set (1990-1993) that was obtained from the National Climatic Data Center (NCDC).

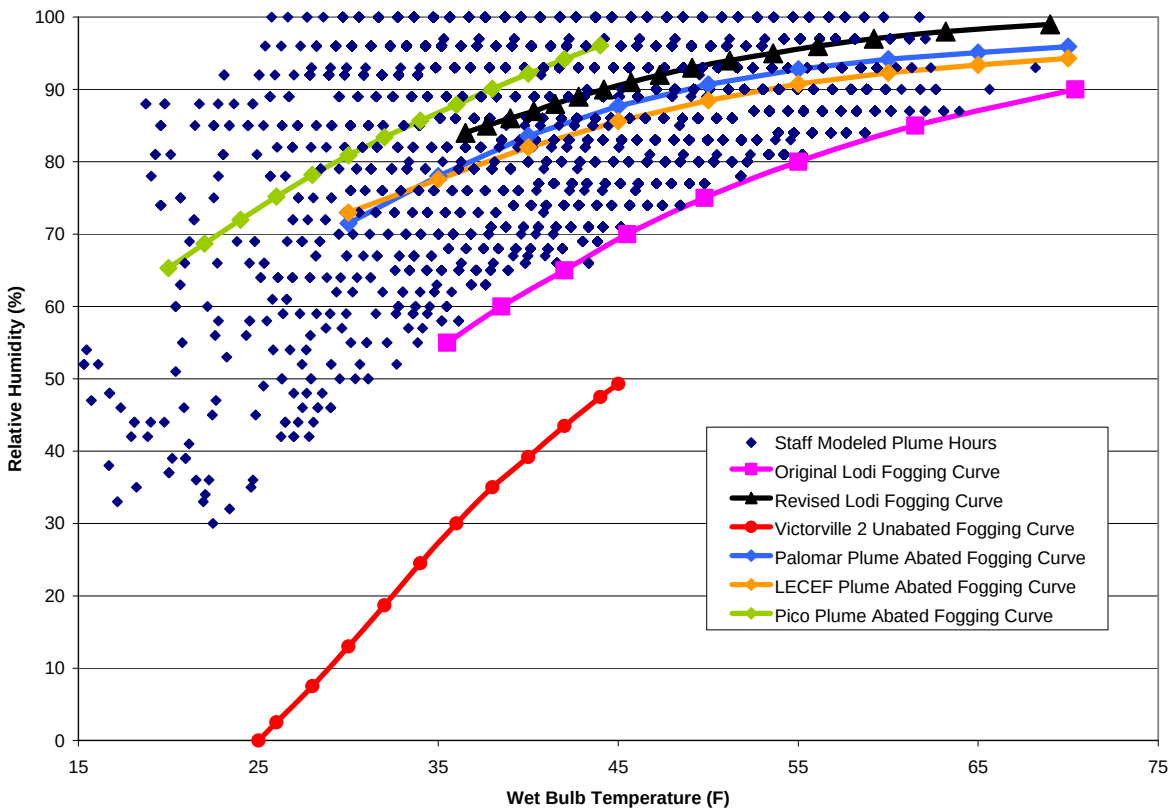
COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

This section is organized as follows: Updated Cooling Tower Design and Cooling Tower Ground Fogging.

UPDATED COOLING TOWER DESIGN INFORMATION

In **Supplement D** to the AFC**,** submitted by the applicant on July 27, 2009, the applicant provided a revised plume fogging frequency curve. After reviewing that plume fogging frequency curve, staff determined that the cooling tower would result in minimal plume formation and less than significant visible plume frequencies. A comparison of the original plume fogging frequency curve, staff's modeling results, and fogging frequency curves for other selected projects with non-abated and plume-abated cooling tower designs is provided as **Visible Plume Figure** 1

Visible Plume Figure 1.
Fogging Frequency Curve Comparisons



Sources: CH2MHill 2009g, CH2MHill 2009h, other cooling tower data submitted to the Energy Commission for the following power plant cases during siting or compliance: Victorville 2 Hybrid Power Project; Palomar Energy Project; Los Esteros 2 Power Plant; and Von Raesfeld (formerly Pico) Power Plant.

As this figure clearly indicates, the applicant's new fogging frequency curve, as compared with other projects' fogging frequency curves, must represent a plume-abated cooling tower. For example, the new Lodi curve is significantly above (represented a lower plume formation potential) the old Lodi curve and above the Palomar and LECEF plume-abated tower fogging frequency curves and just under the Von Raesfeld (Pico) plume-abated tower curve.

Also, as the figure indicates, staff's original modeling analysis based on the applicant's original cooling tower operating data indicated plume frequencies that matched extremely well with the original fogging frequency curve provided by the applicant (CH2MHill 2009g). Visible plumes, based on this new fogging frequency curve, are expected very infrequently or well below 20 percent of seasonal daylight clear hours. Therefore, based on this cooling tower design the cooling tower will have less than significant visible plumes.

COOLING TOWER GROUND FOGGING MODELING RESULTS

Based on the applicant's revised, apparently plume-abated, cooling tower design staff no longer has concerns related to ground fogging impacts to the surrounding roads. However, staff believes that a condition of certification stipulating this revised design is necessary to ensure that there will be no ground fogging traffic impacts to the nearby I-5 freeway from the cooling tower.

HRSG VISIBLE PLUME PARAMETERS AND MODELING ANALYSIS

Staff evaluated the Applicant's AFC and performed an independent psychrometric 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, the frequency of visual plumes can be estimated. The operating data for these stacks are provided in **Visible Plume Table 5**.

Visible Plume Table 5
HRSG Exhaust Parameters [a]

Parameter	**HRSG Exhaust Parameters**		
Stack Height	150 feet (47.2 meters)		
Stack Diameter	19 feet (5.78 meters)		
Ambient Conditions	Moisture Content (Percent by weight)	Exhaust Flow Rate (klbs/hr)	Exhaust Temp (°F)
Full Load with Duct Firing			
61.2°F, 67% RH	6.04	3,622	178
107.7°F, 18% RH	8.18	3,489	181
Full Load with No Duct Firing			
23.7°F, 81% RH	4.83	3,778	183
61.2°F, 67% RH	5.59	3,556	187
107.7°F, 18% RH	7.68	3,422	190

Source: NCPA 2008a, Table 5.13-4, Appendix Table 5.1A-3
Note: (a) Values were extrapolated or interpolated between hourly ambient condition data points as necessary.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a four-year meteorological data set from Sacramento. **Visible Plume Table 6** includes the CSVP model visible plume frequency results for base-load operations, with and without duct firing.

Visible Plume Table 6
Staff-Predicted Hours with HRSG Steam Plumes
Sacramento 1990-1993 Meteorological Data

Case	Available (hr)	Full Load with Duct Firing		Full Load with No Duct Firing	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	34,980	7,423	21.22%	4,372	12.50%
Daylight Hours	17,865	1,704	9.54%	982	5.50%
Daylight No Rain No Fog	16,028	517	3.23%	199	1.24%
Seasonal Daylight No Rain No Fog*	6,123	485	7.92%	194	3.17%
Seasonal Daylight Clear**	3,475	259	7.45%	126	3.63%

*Seasonal conditions occur anytime from November through April.
**Available hours based on seasonal daylight clear hours.

A visible plume frequency of 20 percent of seasonal (November through April) daylight clear hours was used as a plume impact study threshold trigger. Base load operation with or without duct firing is predicted to produce infrequent visible gas turbine/HRSG plumes, well below 20 percent of seasonal daylight clear hours.

UPDATED HRSG DESIGN

The applicant has revised the turbine design from a GE rapid response turbine to a slightly larger Siemens rapid-response turbine that will not have duct firing. The exhaust temperatures and moisture contents are similar to the GE turbine operating in no duct firing mode (CH2MHill 2009c); therefore, staff has concluded that this new turbine selection will not change the impact determination for the HRSG visible plumes, the impact remains less than significant due to staff's determine low visible plume frequency potential for the turbine/HRSG exhaust.

CONCLUSIONS

The applicant's revised; apparently plume-abated, cooling tower design will reduce plume formation well below staff's significance criteria. However, should this design not be built the potential exists for significant visible plumes. Consequently, staff is recommending **Condition of Certification VIS-5** to require the applicant to meet the cooling tower fogging frequency curve provided to staff for impact analysis.

Visible water vapor plumes from the proposed Lodi gas turbine/HRSG exhausts are predicted to occur infrequently and would occur well below 20 percent of seasonal daylight clear hours. Therefore, no further visual impact analysis of the predicted HRSG exhaust plume dimensions has been completed.

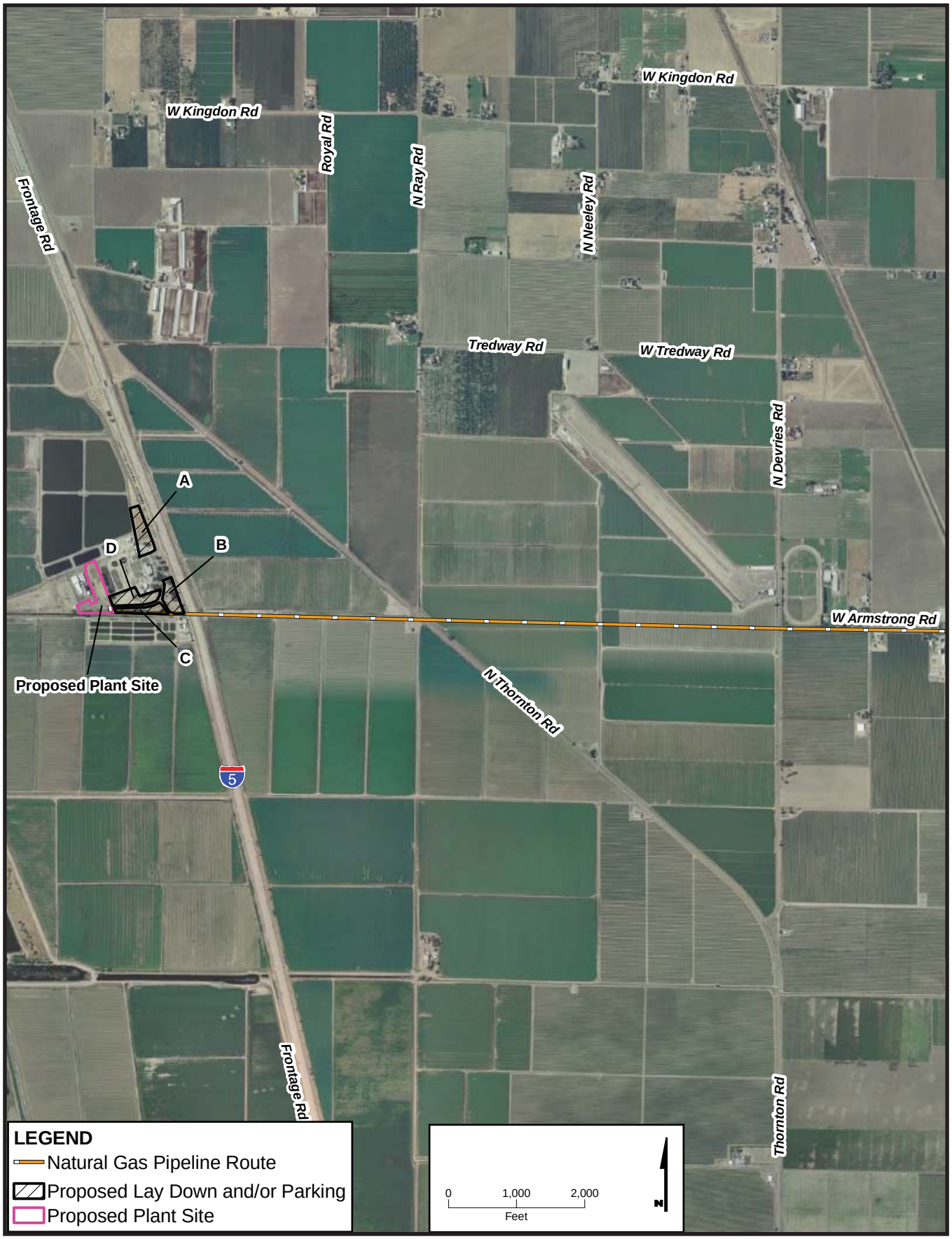
REFERENCES

CH2MHILL 2009g – Data Response Set 2; Responses to CEC Staff Data Requests 56B through 74; February 9, 2009. Submitted to CEC Docket Unit on February 17, 2009, tn 50159.

CH2MHILL 2009c – Supplement D - Changes to Equipment and Project Fenceline, dated July 2009. Submitted to CEC Docket Unit on July 27, 2009, tn 52595CH2MHILL

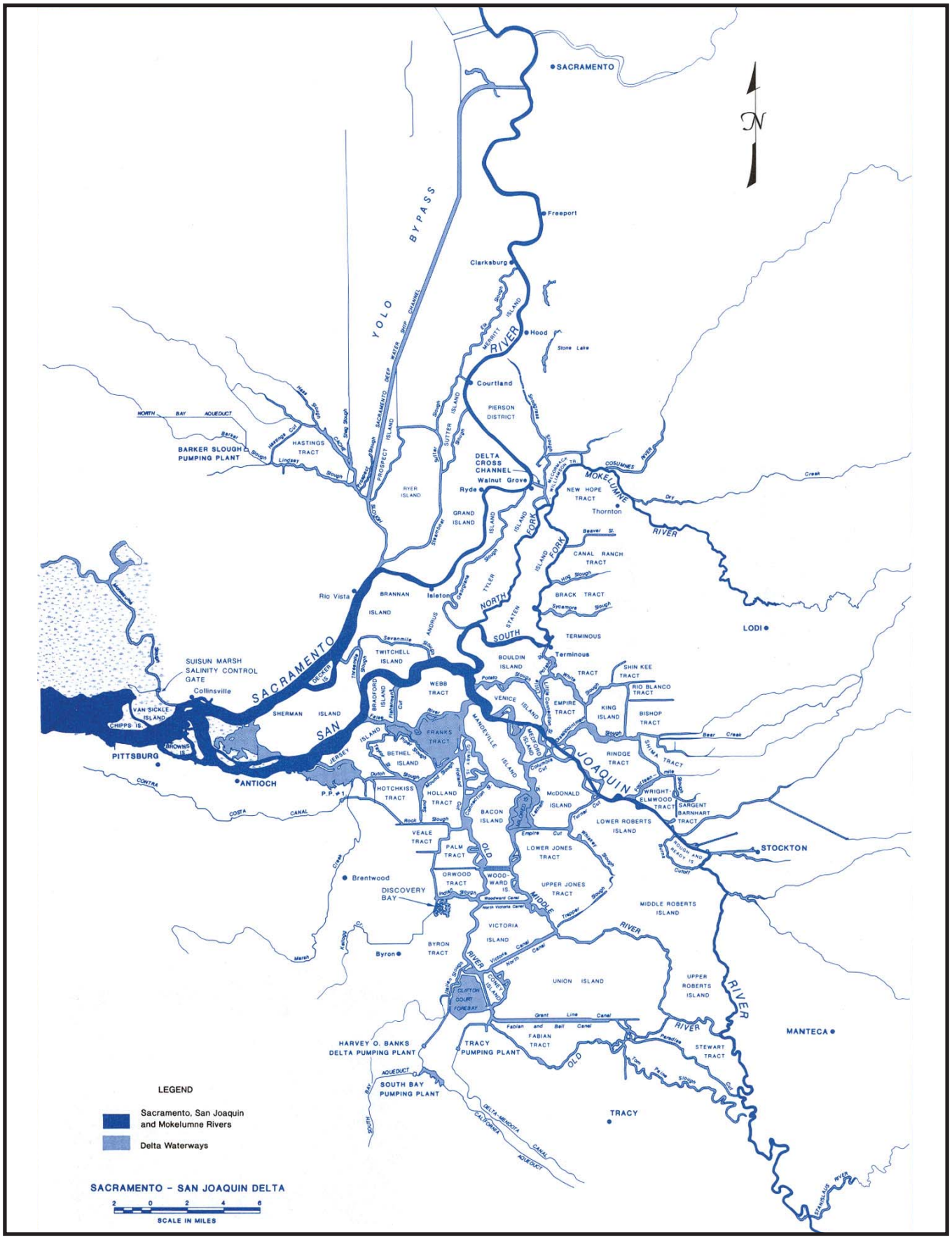
NCPA 2008a – Application For Certification (AFC) Volumes I and II, dated September 10, 2008; Submitted to CEC Docket Unit on September 10, 2008, tn 47973.

VISUAL RESOURCES - FIGURE 1
Lodi Energy Center - Location Map



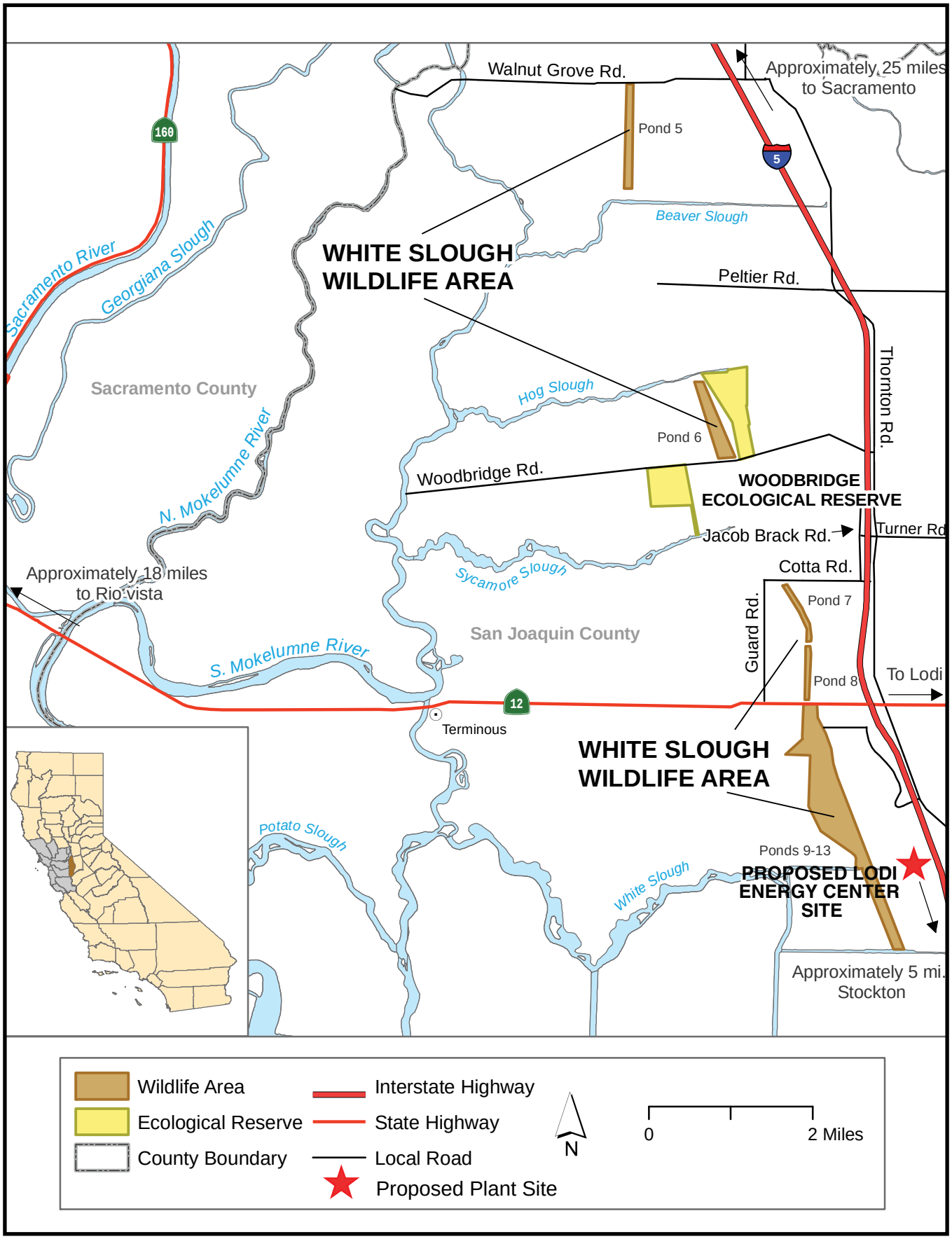
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 1.1-3

VISUAL RESOURCES - FIGURE 2
Sacramento - San Joaquin Delta



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: DWR Delta Atlas

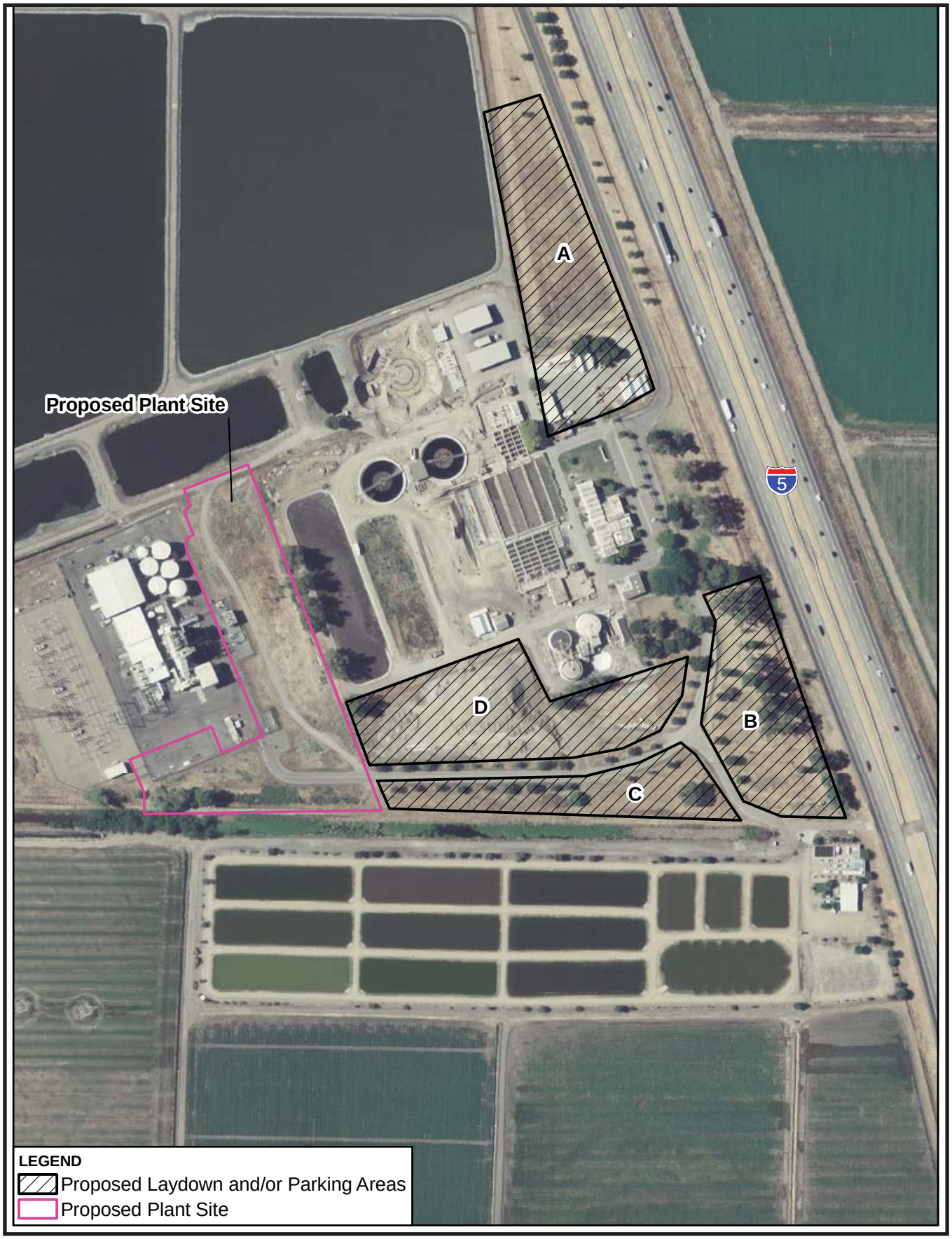
VISUAL RESOURCES - FIGURE 3
White Slough Wildlife Area



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Fish and Game, March 2008

VISUAL RESOURCES - FIGURE 4

Lodi Energy Center - Construction Laydown and Parking Areas



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, OCTOBER 2009

SOURCE: Supplement D

VISUAL RESOURCES - FIGURE 5
Lodi Energy Center - KOP Location Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 5.13-1

VISUAL RESOURCES - FIGURE 6

Lodi Energy Center - KOP 1 - Existing View -

View from Interstate 5, Southbound One-Half Mile Northeast of Site

SOURCE: Supplement D

VISUAL RESOURCES - FIGURE 7

Lodi Energy Center - KOP 1 - Simulated View -

View from Interstate 5, Southbound One-Half Mile Northeast of Site

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SOURCE: Supplement D

VISUAL RESOURCES - FIGURE 8

Lodi Energy Center - KOP 2 - Existing View -

View from White Slough Wildlife Area, One-Half Mile Northwest of Site

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SOURCE: Supplement D

VISUAL RESOURCES - FIGURE 9

Lodi Energy Center - KOP 2 - Simulated View -

View from White Slough Wildlife Area, One-Half Mile Northwest of Site

SOURCE: Supplement D

VISUAL RESOURCES - FIGURE 10

Lodi Energy Center - KOP 3 - Existing View -
View from Eight Mile Road, Two Miles Southwest of Site

SOURCE: AFC Figure 5.13-4A

VISUAL RESOURCES - FIGURE 11

Lodi Energy Center - KOP 3 - Simulated View -
View from Eight Mile Road, Two Miles Southwest of Site

SOURCE: AFC Figure 5.13-4B

WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Staff requires additional information to conclude that management of the waste generated during construction and operation of the Northern California Power Agency (NCPA) Lodi Energy Center (LEC) would not result in any significant adverse impacts, and would comply with applicable laws, ordinances, regulations, and standards (LORS). The initial results reported in the Phase II Environmental Site Assessment were not accurate and suggested there was significant contamination of onsite soils. The City of Lodi noticed that the results were reported incorrectly, and that they would provide an updated report reflecting an accurate interpretation of the results. A revised Phase II Environmental Site Assessment (ESA) of the LEC project site should be provided to California Energy Commission and the Department of Toxic Substances Control (DTSC) staff for further review and determination of whether any mitigation of potential impacts is required.

Although the final test results have not been submitted, the remainder of the waste management elements for the LEC project would not result in adverse impacts and would comply with applicable LORS provided the applicant complies with staff's recommended conditions of certification.

INTRODUCTION

This Staff Assessment (SA) presents an analysis of issues associated with existing wastes onsite and wastes generated from the proposed construction and operation of the LEC. The technical scope of this analysis encompasses solid wastes existing onsite and those to be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The Energy Commission staff's objectives in conducting this waste management analysis are to ensure that:

- Any existing wastes on-site are adequately characterized and remediated in accordance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The management of project wastes would be in compliance with all applicable LORS.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the LEC with respect to management of waste.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §§6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al).	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al, establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions and responsibilities, as well as research, training, and grant funding provisions.
Title 42, U.S.C., §§ 9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes.	These regulations were established by United States Environmental Protection Agency (USEPA) to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. USEPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of USEPA.
Title 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.

Applicable Law	Description
State	
California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended.	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5. Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
California Health and Safety Code,, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). San Joaquin County Department of Environmental Health is the area CUPA.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400-15410). • Article 10 – Business Reporting to CUPAs (§§15600 – 15620).

Applicable Law	Description
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989.	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements.
Title 14, CCR, Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions.
California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the State's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4 year cycle, with a summary progress report due to DTSC every 4th year.
Title 22, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the Act.
Local	
San Joaquin County Certified Unified Program Agency (CUPA) Program (San Joaquin County Board of Supervisors Resolution R-95-760)	This program consolidates, coordinates and makes consistent the administrative requirements, permitting, inspection activities, enforcement activities and fees for hazardous waste and hazardous materials programs in each jurisdiction.
San Joaquin County Hazardous Waste Generator Program	This program ensures protection of public health and the environment from exposure to hazardous waste by regulation of the businesses and industries that generate hazardous waste. It includes a comprehensive program of inspection, chemical emergency response, and surveillance, and complaint investigation, assistance to industry, public education, and enforcement.

Applicable Law	Description
San Joaquin County Ordinance Code, Sections 5-2100 through 5-2900 et seq.	These ordinances protect the public health and the environment from the effects of improper storage, collection, transportation and disposal of solid waste. The San Joaquin County Environmental Health Department is certified by the State as the Local Enforcement Agency (LEA) for enforcement of solid waste laws and regulations within the unincorporated area of San Joaquin County and all of the incorporated cities except the City of Stockton.
San Joaquin County Hazardous Waste Tiered Permitting Program	This program ensures that hazardous wastes treated on site prior to reuse or disposal are stored, handled and disposed of in compliance with state and federal laws and regulations. Inspection, surveillance and permitting is required as part of the county Unified Program.
San Joaquin County Environmental Health Emergency Response Program	Interagency emergency response team guidelines for incidents involving hazardous material spills or releases, including health assessments to evaluate actual or potential environmental contamination and/or human exposure, recommendations for short and long-term cleanup, and oversight of the cleanup activities performed by the responsible parties or environmental assessment firms.

SETTING

EXISTING SITE CONDITIONS

The proposed LEC is a 255-megawatt (MW) natural gas-fired, combined-cycle generating facility (NCPA 2008 a, page 1-1). The facility will be located on a 4.4-acre parcel in the city of Lodi, San Joaquin County, California (NCPA 2009 f, Data Request 50 and 51). The proposed facility is located on San Joaquin County Assessor's Parcel Number 055-130-16. It is west of the city of Lodi's White Slough Water Pollution control Facility (WSWPCF) (NCPA 2008 a, page 5.14-1).

A Phase I ESA of the proposed project site, dated June 2008, was prepared by Carlton Engineering, Inc. in accordance with the American Society for Testing and Materials (ASTM) Standard Practice E 1527-05. The Phase I ESA is included as Appendix 5.14 in Volume 2 of the project AFC (NCPA 2008 e). The proposed Lodi Energy Center project site is largely undeveloped. The western portion of the site includes the gas compressor and cooling towers that are used to operate the adjacent STIG facility. The site has also been used to store the WSWPCF improvement project construction materials. The materials stored on the site include curing compounds, automotive batteries and lubricating compounds. Gray silty material from discharges of WSWPCF wastewater pond sludge is also present on site. **Waste Management Figure 1** shows where miscellaneous equipment, sludge deposits and waste items are located on the proposed project site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This Waste Management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction and operation.

A. For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

   As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an Application for Certification (AFC). The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

   In general, the Phase I ESA uses a qualified Environmental Professional (EP) to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the EP then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the EP may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

   If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

[1] Title 20, California Code of Regulations, Section 1704(c) and Appendix B, section (g) (12) (A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

In conducting its assessment of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

B. Regarding the management of project-related wastes generated during construction and operation of the proposed project, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management. Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The Phase I ESA conducted for the proposed LEC site did not identify any recognized environmental conditions (REC) associated with the proposed project site and linear facility corridors (NCPA 2008 a, page 5.14-2). (A REC is defined by ASTM as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.") However, given the past land uses and proposed construction, Energy Commission staff requested that the project owner provide a Phase II ESA with site soil sampling to verify that harmful concentrations of any contaminants are not present at the proposed project site. Staff requested that the project owner sample the project site in accordance with the California Department of Toxic Substances Control (DTSC) "Interim Guidance for Sampling Agricultural Fields for School Sites (Second Revision August 26, 2002)". While this guidance document is identified as being specific to school sites, DTSC also uses the guidance for all types of commercial and industrial businesses constructed on agricultural properties. The guidance is intended to assist environmental assessors in designing an initial investigation for sites with historical agricultural uses.

The results of the preliminary soil sampling and analytical testing initially presented by the applicant in the Phase II ESA indicated that the LEC site may have been affected by previous site activities, including deposition of wastewater pond sludge, and storage of various materials such as concrete curing compounds, automobile batteries, and lubricating compounds. Residual contaminants detected at the site include metals, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPHs) (CH2MHILL 2009e Data 52).

When the results from the Phase II were first presented to Energy Commission and DTSC staff, they showed high levels of organochlorine pesticides (such as dieldrin) and

polycyclic aromatic hydrocarbons (PAHs) in the soil. Some of these residual contaminants were listed at concentrations above the risk-based industrial soil criteria. Based on the initial interpretation of the results, Energy Commission staff believed that there may be a potential contaminant exposure issue for construction workers and onsite industrial workers due to surface and subsurface soils that could result in adverse health effects.

However, it was later determined that there was an error in the presentation of the Phase II ESA analytical results. The original Phase II ESA incorrectly reported the soil contaminants in unit measurements of milligrams per kilogram (or parts per million), when the concentrations were actually measured in micrograms per kilogram (parts per billion). This error in presentation of the data resulted in DTSC initially determining that the site soil was heavily contaminated and required remedial action prior to industrial use (Gillette 2009b). Staff and DTSC are currently awaiting resubmission of the corrected results to determine whether any further characterization and remediation may be necessary. This information is needed for staff to complete analysis of potential waste management impacts.

The 12-inch diameter natural gas line will parallel an existing PG&E 3-mile pipeline that serves the existing STIG plant. The existing pipeline was installed in late 1994 to 1995. The natural gas pipeline is located in a large area of agricultural fields. The crops along the pipeline consist mainly of alfalfa and grapes (NCPA 2008 g, Data Response 56). The Kingdon Airport located at 12145 N. Devries Road is 0.10 mile north of the proposed pipeline route. The San Joaquin County Environmental Health Department confirms that there have been no spills or records of environmental concerns along the length of the proposed gas line route. (NCPA 2008 e, page 4).

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms (NCPA 2008 a, Section 5.14.1.2.1). To facilitate proper management of project construction wastes, staff proposes Condition of Certification **WASTE-1** requiring the project owner to develop and implement a Construction Waste Management Plan. This condition would require the applicant to identify type, volume, and waste disposal methods to be used during construction of the facility.

Non-hazardous Wastes

Non-hazardous solid wastes generated during construction would include approximately 205 tons of scrap wood, concrete, steel/metal, paper, glass, and plastic waste (NCPA 2008a, Section 5.14.2.4). San Joaquin County operates the Construction and Demolition (C&D) Waste Diversion Program. The only jurisdiction that has an approved C&D in the county is the city of Stockton. The city of Lodi does not have a C&D Waste Diversion Program (NCPA 2008 f, Data Response 53). However, all non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, §17200 et seq.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water would be contained at designated wash areas and transported to a sanitary wastewater treatment facility. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

Hazardous Wastes

The proposed LEC would generate two tons of hazardous wastes during construction, not including contaminated soil remediation. Construction waste will include empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and cleaning wastes. The amount of waste generated would be minor if handled in the manner identified in the AFC (NCPA 2008a, Section 5.14.2.4).

DTSC issues permanent California identification numbers to generators, transporters and disposal facilities for the purposes of tracking hazardous waste (Title 22 California Code of Regulations, Section 66262.12) and ensuring proper disposal. The project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction pursuant to proposed Condition of Certification **WASTE-4**. Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site. Wastes would be accumulated onsite for less than 90 days and then properly manifested, transported and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Section 5.14.2.3 and in the responses to data requests, and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-5** to notify the Energy Commission's Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

In the event that construction excavation, grading or trenching activities for the proposed project encounter potentially contaminated soils, specific handling, disposal, and other precautions may be necessary pursuant to hazardous waste management LORS, staff finds that proposed Conditions of Certification **WASTE-2** and **WASTE-3** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with LORS. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed LEC would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-2 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed. Before operations can

begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-6**. The purpose of the Operation Waste Management Plan is to avoid the potential effects on human health and the environment from handling and disposing of hazardous wastes, procedures will be developed to ensure proper labeling, storage, packaging, recordkeeping, and disposal of all hazardous wastes.

Non-hazardous Solid Wastes

The proposed LEC would generate 39 tons of non-hazardous waste per year during project operation. Wastes would include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass) (NCPA 2008 a, page 5.14-11). All non-hazardous wastes would be recycled to the extent possible, and non-recyclable wastes would be regularly transported offsite to a local solid waste disposal facility (NCPA 2008 a, section 5.14.2.3.1).

Two thousand pounds per year of cooling tower basin sludge would be generated during operation. The sludge would be disposed of in a Class II landfill if testing shows it is nonhazardous. If testing shows the sludge is hazardous then disposal in a Class I landfill would be required. To ensure proper disposal of sludge, staff proposes **WASTE-7** which requires that the project owner perform the appropriate tests to classify the waste and determine the appropriate method of disposal.

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation, and are discussed in the **SOIL AND WATER RESOURCES** section of this document.

Hazardous Wastes

The proposed LEC would generate three tons of hazardous wastes per year during routine project operation. Wastes would include used hydraulic fluids, oils, greases, oily filters and rags, spent SCR catalyst, cleaning solutions and solvents, and batteries (NCPA 2008 a, page 5.14-11). In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices will help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-8** requiring the project owner/operator to report, clean-up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of the SA.

The amounts of hazardous wastes generated during the operation of LEC would be minor, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on-site, transported offsite by licensed hazardous waste haulers, and recycled or disposed at authorized disposal

facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-5** to notify the CPM whenever the owner becomes aware of any such action.

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed condition of certification **WASTE-4**, would be retained and used for hazardous waste generated during facility operation.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

The construction associated with LEC will produce a variety of mixed nonhazardous wastes, such as wood, metal, plastics, etc. Waste will be recycled where practical and non-recyclable waste will be deposited in a Class III landfill. During construction of the proposed project, approximately 1,025[2] cubic yards (205 tons) of solid waste will be generated and recycled or disposed in a Class III landfill (NCPA 2008 a, Section 5.14.2.4). The non-hazardous solid wastes generated yearly at LEC would also be recycled if possible, or disposed in a Class III landfill.

Table 5.14-3 of the project AFC identifies four non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the LEC. These Class III landfills are all located in San Joaquin County. The remaining capacity for the four landfills combined is over 116 million cubic yards. The total 1,235[2] cubic yards (247 tons) of nonhazardous waste generated from project construction and operation, 1,025 and 210 cubic yards, respectively, will contribute less than 1% of the available landfill capacity (NCPA 2008 a, 5.14-11). Staff believes that disposal of the solid wastes generated by the LEC can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Operation and maintenance of the plant and associated facilities will generate a variety of wastes, including hazardous wastes. To control air emissions, the project's turbine units would use selective catalytic reduction and oxidation catalyst equipment and chemicals, which generate both solid and hazardous waste. The hazardous waste generated during this phase of the project will consist of electrical equipment, used oils, universal wastes, solvents, and empty hazardous waste materials. (NCPA 2008 a, Section 5.14.1.2). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

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[2]Cubic yards calculated using California Integrated Waste Management Board construction/demolition and inert debris tools and resources – 400 pounds per cubic yard http://www.ciwmb.ca.gov/leatraining/Resources/CDI/Tools/Calculations.htm

Section 5.14.2.3.2 of the project AFC discusses the two Class I landfills in California: The Clean Harbor Landfill (Buttonwillow) in Kern County, and the Chemical Waste Management Landfill (Kettleman Hills) in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is in excess of 15 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with approximately 30 years of remaining operating lifetimes. The LEC construction and operation waste will likely be sent to the Buttonwillow facility.

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled will be transported offsite to a permitted treatment, storage, or disposal facility. The five tons of hazardous waste generated from project construction and operation will contribute less than 1% of the available landfill capacity (NCPA 2008 a, page 5.14-11). Staff believes that disposal of the solid wastes generated by the LEC can occur without significantly impacting the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” There are 21 projects in various stages of development in the City of Lodi. Seventy-two projects are proposed to be developed in San Joaquin County and will generate waste; however, there are no estimates for the amount of waste that would be generated by these proposed projects. (NCPA 2008 a, Section 5.14.3).

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the LEC would add to the total quantity of waste generated in the State of California. However, project wastes would be generated in modest quantities. During construction approximately 1,025 cubic yards (205 tons) of solid waste including 10 cubic yards (2 tons) of hazardous waste would be generated. During operation 210 cubic yards (42 tons) per year of solid waste and 15 cubic yards (3 tons) of hazardous waste would be generated (LEC 2008a Section 5.14.3). Waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. There is over one billion cubic yards of remaining capacity at the four solid waste disposal facilities in San Joaquin County listed in the AFC (NCPA 2008 a, page 5.14-9). In 2008, 1,597,874 tons of solid waste was landfilled in San Joaquin County (http://www.ciwmb.ca.gov/Landfills/Tonnages/Default.aspx). Using a conversion factor of 100 pounds per cubic yard, which is characteristic of uncompacted municipal waste, staff estimates this would occupy approximately 32,000,000 cubic yards. Therefore, given the current remaining storage volume and minor waste volume generated by the project in comparison to current waste disposal volumes, staff concludes that the waste generated by the LEC would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed LEC would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. Staff is awaiting additional information regarding potential existing wastes on site so further analysis of potential impacts and the need for compliance with LORs can be evaluated. The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the LEC would be required to obtain a hazardous waste generator identification number from U.S. EPA. The LEC would also be required to properly store, package and label all hazardous waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In the **SOCIOECONOMICS** section of this staff assessment, staff presents census information that shows that there are minority populations within one mile and six miles of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous waste to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the power plant on minority populations. Therefore, there are no environmental justice issues for Waste Management.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments on the proposed project from the DTSC April 16, 2009 (Gillette 2009a). DTSC also reviewed and commented on the Phase I and Phase II ESA reports provided by NCPA. In response to the initial interpretation of analytical results, which showed there was significant contamination at the site, DTSC worked with the city of Lodi (the landowner) and NCPA (the project owner) to establish a soil remediation strategy at the LEC project site. The project owner entered into a Voluntary Cleanup Agreement (VCA) with DTSC (CEC 2009 e). The DTSC Voluntary Cleanup Program allows motivated parties who are able to fund the characterization and remediation of a site and the cost for DTSC's oversight, to move ahead at their own pace to satisfy cleanup requirements.

However, there was an error in the presentation of the Phase II ESA analytical results. The original Phase II ESA incorrectly reported the soil contaminants in unit measurements of milligrams per kilogram (or parts per million), when the actual units were measured in micrograms per kilogram (parts per billion). This error in the data presentation created an inaccurate impression that the site soil was contaminated and required remedial action prior to industrial use. Therefore the VCA was cancelled with DTSC.

CONCLUSIONS

Consistent with the main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1. After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90, 180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **8**. These conditions would require the project owner to do all of the following:

   - Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-2**, and **3**).
   - Obtain a hazardous waste generator identification number (**WASTE-4**).
   - Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-1** and **6**).
   - Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-5**).
   - Ensure proper disposal of the cooling tower sludge (**WASTE-7**).
   - Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-8)**.

2. Existing conditions at the LEC project site include areas where prior site uses may have resulted in releases of hazardous substances or soil contamination. Staff may add additional analysis and mitigation, as required, once revised Phase II Environmental Site Assessment (ESA) constituent sampling analysis results are provided by the applicant.

3. Regarding impacts of project wastes on existing waste disposal facilities, the existing available capacity of the four Class II landfills that may be used to manage nonhazardous project wastes exceeds 116 million cubic yards (NCPA 2000a, page 5.14-9).The total amount of nonhazardous wastes generated from construction and operation of LEC would be minimal compared to the remaining landfill capacity

Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of LEC have a combined remaining capacity in excess of 15 million cubic yards. The total amount of hazardous wastes generated by the LEC project would contribute less than 1% of the remaining permitted capacity. Therefore, impacts from disposal of LEC generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff concludes that management of the waste generated during construction, and operation of the LEC would not result in any significant adverse environmental impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the project AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-2 The project owner shall provide the resume of an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation during site characterization (if needed), excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Professional Engineer or Professional 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 for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of DTSC, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional 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 Professional Engineer or Professional Geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the DTSC for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Professional Engineer or Professional 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-4 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide the number to the CPM in the next Monthly Compliance Report.

WASTE-5 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 way project-related wastes are managed.

WASTE-6 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices

to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;

- Information and summary records of conversations with the local Certified Unified Program Agency and the DTSC regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;
- A detailed description of how facility wastes will be managed, and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE- 7 The project owner shall ensure that the cooling tower sludge is tested pursuant to Title 22, California Code of Regulations, Division 4.5, section 66262.10 and report the findings to the CPM.

Verification: The project shall include the results of sludge testing in a report provided to the CPM. If two consecutive tests show that the sludge is non-hazardous, the project owner may apply to the CPM to discontinue testing.

WASTE 8 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned-up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project property or related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned-up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated

soils and materials that may have been generated by the release. Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

CEC 2009 a - Issues Identification Report, dated 01/06/09. Submitted to CEC Docket Unit on 01/07/09, tn 49621.

CEC 2009 b - Lodi Energy Center Project (08-AFC-10) Data Request Set 1 (#s 1-55), dated 01/07/09. Submitted to CEC Docket Unit on 01/07/09, tn 49639.

CEC 2009 c - Lodi Energy Center Project (08-AFC-10) Data Request Set 2 (#s 56-74), dated 2/04/09. Submitted to CEC Docket Unit on 02/04/09, tn 49974.

CEC 2009 e - Lodi Energy Center Project (08-AFC-10) CEC meeting with DTSC and CH2MHILL subject NCPA VCA 4/16/09. Submitted to CEC Docket Unit on 04/16/09, tn 5114.

CH2MHILL 2009 d – Supplement C Natural Gas Supply Line Route change, dated 03/19/09. Submitted to Docket Unit on 03/19/09, tn 50601.

CH2MHILL 2009 e – Data Response Set 1C, Data Request 52 and 56, dated 03/02/09. Submitted to Docket Unit on 03/02/09, tn 50537.

Gillette 2009a – Teleconference with Ellie Townsend-Hough concerning NCPA Voluntary Cleanup Agreement, dated 04/16/09.

Gillette 2009b – Email communication with Ellie Townsend-Hough concerning discrepancy in Phase II sampling results, dated 10/01/09.

NCPA 2008 a - Application for Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 b - Data Adequacy Response, Supplement B, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

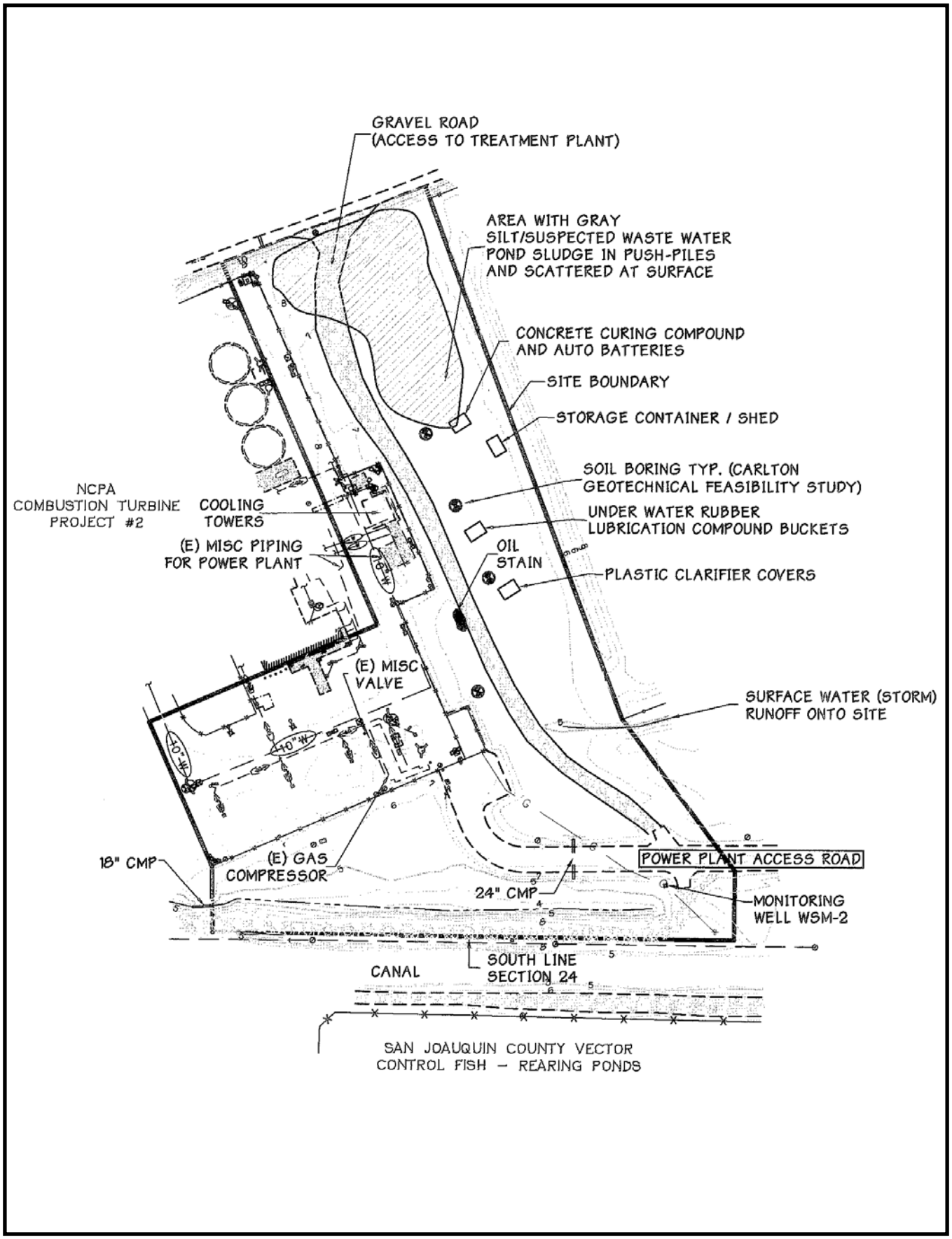
NCPA 2008 d - Appendix 5.6A, Current Development Projects for the city of Lodi and San Joaquin County, dated 09/10/08. Submitted to CEC Docket Unit on 9/10/08, tn 47973

.NCPA 2008 e - Appendix 5.14A, Final Phase I - Environmental Site Assessment, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 f - Data Request Set 1A, Responses to Data Requests #s1-55, Attachment DR38-1, and Interconnection Facilities Study, dated 02/05/09. Submitted to CEC Docket Unit on 02/05/09, tn 50006.

WASTE MANAGEMENT - FIGURE 1

Lodi Energy Center - Equipment, Sludge Deposits and Waste on Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009

SOURCE: AFC

WORKER SAFETY AND FIRE PROTECTION

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

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Lodi Energy Center (LEC) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant 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.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services. The proposed facility would be located in an area that is currently served by the local fire department. The fire risks at the proposed facility do not pose significant added demands on local fire protection services. In addition, staff finds that the available Hazmat Teams at the Woodbridge Fire Protection District (WFPD) and other nearby fire departments are adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time.

INTRODUCTION

Worker safety and fire protection is regulated through LORS, at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Staff Assessment (SA) is to assess the worker safety and fire protection measures proposed by the LEC and to determine whether the applicant has proposed adequate measures to:

- Comply with applicable safety LORS;
- Protect the workers during construction and operation of the facility;
- Protect against fire; and
- Provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 651 et seq (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
Title 29 Code of Federal Regulation (CFR) sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 29 CFR sections 1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Specific Hazardous Material Handling Requirements	Provides response agencies with necessary information to address emergencies.

Applicable Law	Description
Emergency Response Plan	Allows response agency to integrate LEC emergency response activities into response actions.
Business Plan	Provides response agency with overview of LEC purpose and operations.
RMP (Certified Unified Program Agency [CUPA], administered by the County)	Provides response agency with detailed review of risks and hazards located at LEC and mitigation implemented to control risks or hazards.
California Fire Code 2007	Adopted by the San Joaquin County and administered by the Woodbridge Fire Protection District (WFPD 2009).

SETTING

The proposed facility would be located in the city of Lodi, adjacent to the White Slough Water Pollution Control Facility (WPCF) and the existing Northern California Power Agency (NCPA) Combustion Turbine Project #2 (STIG plant), within an area that is currently served by the local fire department. Fire support services to the site would be under the jurisdiction of the Woodbridge Fire Protection District (WFPD). There are a total of four fire stations within the WFPD system, staffed by 30 full time firefighters. The closest station to the LEC site would be Station #4, located at 6365 W. Capitol Ave., approximately 1.0 mile north of the site. The total response time from the moment a call is made to the point of arrival at the site would be up to seven minutes (LEC 2008a, Section 5.10.2.6.2 and WFPD 2009). The next closest station would be Station #2, located about 5-6 miles away with a response time of 10-15 minutes (WFPD 2009).

Station #4 would also be the first responder to incidents involving hazardous materials, with backup support provided by the other three Woodbridge stations and by the city of Stockton Fire Department and the city of Lodi Fire Department. Station #4 has trained personnel and equipment for hazmat response, and so does Station #10 of the Stockton Fire Department, which is located about 10 miles from the LEC site. In the event of a large spill, the San Joaquin County Office of Emergency Services Hazardous Materials Response Team would also respond (LEC 2008a, Section 5.5.2.5). All personnel at the WFPD are trained to at least Emergency Medical Technician (EMT)-1 level and as first responders to hazardous materials incidents. The majority of staff at the WFPD is also trained as hazardous materials specialists (WFPD 2009). Staff concludes that the available hazmat teams would be able to respond to any type of incident at the LEC in a timely manor.

Worker Safety and Fire Protection Table 2
Response Capability of the Woodbridge Fire Protection District*

WFPD Station	Response Time**	Distance to LEC	# of Personnel Per Shift	Hazmat/ EMS***
Station #4	7 min	~1 mile	2	Yes/Yes
Station #2	10-15 min	~5-6 miles	2	Yes/Yes

*Source: AFC Section 5.10.2.6.2 (LEC 2008a) and communications with the WFPD (WFPD 2009).
**Total response times are estimated from the moment a 911 call is made to arrival at the site and are dependent upon traffic conditions and other variables.
***All personnel are trained to EMT-1 level and as first responder for hazardous materials incidents.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site in 2008 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action. Several conditions that do not present a threat to human health or the environment were identified and recommendations were made regarding their handling (LEC 2008a, Section 5.14.1.1). To address the remote possibility that soil contamination would be encountered during construction of the LEC, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in **WORKER SAFETY-FIRE PROTECTION**:

1. The potential for impacts on the safety of workers during construction and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during construction and operations.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates

the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed LEC 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 LEC to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program 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

LEC encompasses construction and operation of a natural gas fired-facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. § 1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. § 1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 1514 — 1522)
- Emergency Action Program and Plan

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

- Heavy Equipment Safety Program
- Forklift Operation Program

- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Hazardous Waste Program
- Hot Work Safety Program
- Employee Exposure Monitoring Program
- Electrical Safety Program
- Permit-Required Confined Space Entry Program
- Hand and Portable Power Tool Safety Program
- Housekeeping and Material Handling and Storage Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Hazard Communication Program
- Respiratory Protection Program
- Heat and Cold Stress Monitoring and Control Program
- Pressure Vessel and Pipeline Safety Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (LEC 2008a, Section 5.16.2.3.1). Prior to the start of construction of LEC, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the WFPD pursuant to Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at LEC, 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 (8 Cal Code Regs. § 3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. § 3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. § 3220)
- First Aid, CPR, and Automated External Defibrillator

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would be

applicable to the project. Written safety programs for LEC, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (LEC 2008a, Section 5.16.2.3.2). Prior to operation of LEC, all detailed programs and plans would be provided to the CPM and the WFPD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (LEC 2008a, Section 5.16.2.3.2):

- Identity of person(s) with authority and responsibility for implementing the program;
- Safety and health policy of the plan;
- Definition of work rules and safe work practices for construction activities;
- System for ensuring that employees comply with safe and healthy work practices;
- System for facilitating employer-employee communications;
- Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Safety procedures; and
- Training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (LEC 2008a, Section 5.16.2.3.2). The plan would accomplish the following:

- Determine general program requirements;
- Determine fire hazard inventory, including ignition sources and mitigation;
- Develop good housekeeping practices and proper materials storage;
- Establish employee alarm and/or communication system(s);
- Provide portable fire extinguishers at appropriate site locations;
- Locate fixed fire-fighting equipment in suitable areas;

- Specify fire control requirements and procedures;
- Establish proper flammable and combustible liquid storage facilities;
- Identify the location and use of flammable and combustible liquids;
- Provide proper dispensing and determine disposal requirements for flammable liquids;
- Establish and determine training and instruction requirements and programs; and
- Identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the WFPD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 Cal Code Regs. §§ 3380 to 3400). The LEC operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When to use the protective clothing and equipment;
- Benefits and limitations; and
- When and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. § 3220). The AFC contains a satisfactory outline for an emergency action plan (LEC 2008a, Section 5.16.2.3.2).

The outline lists plans to accomplish the following:

- Establish emergency escape procedures and emergency escape route for the facility;
- Determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;

- Provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- Specify rescue and medical duties for assigned employees;
- Identify fire and emergency reporting procedures to regulatory agencies;
- Develop alarm and communication system for the facility;
- Establish a list of personnel to contact for information on the plan contents;
- Provide emergency response procedures for ammonia release; and
- Determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this **WORKER SAFETY AND FIRE PROTECTION** section.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- Construction injuries account for 15% of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- To improve their safety and health performance;
- To assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- To prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- To recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- Lack of posted confined space warning placards/signs;

- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- Dangerous placement of hydraulic elevated platforms under each other;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad;
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- Lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an on-site reviewer to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed LEC project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the Woodbridge Fire Protection District (WFPD) to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area. The project will rely on both 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 provided by the WFPD (WFPD 2009).

Construction

During construction, portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained, and safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Program (LEC 2008a, Section 5.16.2.3.1).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, with the exception of a second access point (gate) for emergency responders should access through the main gate be blocked or considered dangerous. In order to correct this deficiency, staff proposes Condition of Certification **WORKER SAFETY-5**. This condition would require that the currently-proposed access point for construction vehicles at the northeast corner of the project site remain as a second access point for the duration of the life of the power plant. Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water will be supplied by the WPCF and stored in the raw water/fire water storage tank at the existing STIG plant. The LEC fire loop would tie into the existing fire system in use at the STIG plant and would supply both fire hydrants and fixed suppression systems with sufficient water for two hours of protection (LEC 2008a, Section 2.1.14).

A fixed sprinkler system would be installed in areas of risk including the water treatment building and the cooling tower. A carbon dioxide and dry chemical fire protection system would be provided for the combustion turbine generators and accessory equipment. This system would have fire detection sensors and monitoring equipment that would trigger alarms, turn off ventilation, close ventilation openings, and automatically actuate the suppression systems. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants would be located throughout the facility at code-approved intervals (LEC 2008a, Sections 2.1.14 and 2.4.1.4.1). These systems are standard requirements by the NFPA, and the Uniform Fire Code (UFC) and staff has determined that they will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the WFPD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents

at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrythmias resulting from industrial accidents or other non-work related causes. Staff noticed on an inspection of the control room for the existing STIG power plant that the applicant has a portable AED on site and has an adequate training and inspection program in place. Since this control room will also be used for the proposed LEC and the power plants will be contiguous with each other (that is, no fence in between them), no condition of certification is needed to require an AED.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the LEC project combined with existing industrial facilities and expected new facilities, including the existing adjacent STIG plant, to result in impacts on the fire and emergency service capabilities of the WFPD and found that cumulative impacts are not expected. The WFPD stated that they feel adequately staffed and equipped to respond to incidents at the LEC and that they don't anticipate that the proposed facility would add a burden to their department. The WFPD noted that they have several mutual aid agreements with nearby fire departments, which make them confident that the proposed LEC would not impact their ability to service their jurisdiction (WFPD 2009).

Given the lack of unique fire hazards associated with a modern natural gas-fired power plant, staff finds that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

CONCLUSIONS

Staff concludes that if the applicant for the proposed LEC project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Condition of Certification **WORKER SAFETY-3** through**-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant would not present a significant cumulative impact on the local fire department.

PROPOSED CONDITIONS OF CERTIFICATION

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

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Woodbridge Fire Protection District for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Woodbridge Fire Protection District stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

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

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Woodbridge Fire Protection District for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a

letter to the CPM from the Woodbridge Fire Protection District stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification Worker Safety-3, and for implementing all

appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall identify and provide a second access point for emergency personnel to enter the site. This access would enter from the northeast portion of the site and the method of gate operation shall be submitted to the Woodbridge Fire Protection District for review and comment and to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM, for review and approval, a letter and plot-plan stating and showing that a second access point (gate) will be maintained during construction, commissioning, and operations and a letter from the Woodbridge Fire Protection District with comments on the operation of the second access point or a statement that no comments were received.

REFERENCES

California Fire Code 2007. 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.

LEC 2008a –Application for Certification for the Lodi Energy Center. Dated September 10, 2008.

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

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

WFPD 2009 – Woodbridge Fire Protection District, Record of conversation with Fire Chief Mike Kirkle, May 18, 2009.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The California Energy Commission (Energy Commission) staff concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Lodi Energy Center (LEC). The purpose of this analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (NCPA 2008a, Appendix 2B). Key LORS are listed in **Facility Design Table 1,** below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	San Joaquin County regulations and ordinances city of Lodi regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The LEC would be built on an approximately 4.4-acre site, located in the city of Lodi, San Joaquin County. For more information on the site and its related project description, please see the **PROJECT DESCRIPTION** section of this document. Additional engineering design details are contained in the AFC, Appendix 2B (NCPA 2008a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the Energy Commission compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see

NCPA 2008a, Appendix 2B, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this 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 that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed condition of certification (**GEN-2),** below.

LEC shall be designed and constructed to the 2007 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 when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated 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 according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (NCPA 2008a, Appendix 2B) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that LEC is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In

addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures 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 perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite the city of Lodi, San Joaquin County, or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both 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 engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing," to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- Proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- All applicable LORS, local/regional plans, and proof of adherence to those 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.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **GENERAL CONDITIONS**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply 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 will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that LEC is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could 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 decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 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 the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the 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 the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions 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 ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met 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.

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 that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. 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 upon request.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists 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 2,** 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.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	1
CT Enclosure Structure, Foundation and Connections	
CT Generator Foundation and Connections	1
Exhaust Stack Structure, Foundation and Connections	1
CT Exhaust Duct Structure, Foundation and Connections	1
CT Step-up Transformer Foundation and Connections	1
Unit Auxiliary Transformer Skid Foundation and Connections	1
CT Inlet Air Filter House Structure, Foundation and Connections	1
Heat Recovery Steam Generator (HRSG) Structure	1
HRSG Foundation and Connections	1
HRSG High Pressure Tubing	1
Water Treatment Building Structure, Foundation and Connections	1
Cooling Tower Chemical Building Structure, Foundation and Connections	1
Demineralized Water Tank Structure, Foundation and Connections	1
CEMS Building Structure, Foundation and Connections	1
STIG Plant Cooling Tower Structure, Foundation and Connections	1
Water Treatment/Chemical Treatment PDC	1
LCI Isolation Transformer Foundation and Connections	1
Boiler Feed Pumps Structure Foundation and Connections	1
Boiler Blowdown Tank Structure, Foundation and Connections	1

Equipment/System	Quantity (Plant)
Generator Circuit Breaker Foundation and Connections	1
Fire/Raw Water Tank Structure, Foundation and Connections	1
Steam Turbine (ST) Foundation and Connections	1
ST Generator Foundation and Connections	1
ST Step-Up Transformer Foundation and Connections	1
ST PDC Structure, Foundation and Connections	1
CT PDC Structure, Foundation and Connections	1
HRSG PDC Structure, Foundation and Connections	1
Excitation Transformer Foundation and Connections	1
Cooling Tower Pump Structure Foundation and Connections	1
Warehouse Structure, Foundation and Connections	1
Waste Water Storage Tank Structure, Foundation and Connections	1
Control Room Structure, Foundation and Connections	1
Fuel Gas Compressors with Foundation and Connections	3
Cooling Tower Structure, Foundation and Connections	1
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
Prefabricated Assemblies	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, 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 2007 CBC, 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 otherwise agreed upon 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 applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the 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 that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets 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 when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet 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 time frame) 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) is subsequently reassigned or replaced, the project owner has five days 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 civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. 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: 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; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the 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 (for example, 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.

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, geotechnical, or soils reports 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 the design of), 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 to 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, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the 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 to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in

the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. 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.

E. 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 to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. 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 time frame) 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, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) 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, including prefabricated assemblies, 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 2007 CBC. 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 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).

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. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) 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 required corrective actions. 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, 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. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

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 the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

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, geotechnical, or foundation investigations reports required by the 2007 CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) 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.

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 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, 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.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) 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, along 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 2** 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 2**, above):

1. Major project structures;

2. Major foundations, equipment supports, and anchorage; and

3. Large field-fabricated tanks.

Construction of any structure or component shall not begin 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 (for example, 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;

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;

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; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** 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 comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

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. 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 2007 CBC, 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 the 2007 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 time frame) 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 2**, 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 that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- 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
- City of Lodi and San Joaquin County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, 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 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 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 that installation.

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 time frame) 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 that 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.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) 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 all electrical equipment and systems 480 Volts or higher (see a representative list, 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. 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. 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 shall 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 must 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 time frame) 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

NCPA 2008a - Application For Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

GEOLOGY AND PALEONTOLOGY

Testimony of Patrick A. Pilling, Ph.D., P.E, G.E.

SUMMARY OF CONCLUSIONS

The proposed Northern California Power Agency (NCPA) Lodi Energy Center (LEC) site is located in an active geologic area of the Great Valley physiographic province approximately 20 miles east of the boundary between the Coast Ranges and the Great Valley physiographic provinces. The project site is located in San Joaquin County approximately six miles southwest of the city of Lodi, California, near the eastern edge of the San Joaquin/Sacramento deltas. Potential geologic hazards include strong earthquake-related ground shaking due to the site's geologic setting; liquefaction and associated lateral spreading of loose and submerged granular soils; excessive consolidation settlement of native fine grain soils; and expansive clay soils. The possible impact of these geologic hazards on the proposed facility must be mitigated, to the extent practical, through structural designs required by the 2007 California Building Code (CBC). In addition, the design-level geotechnical investigation required for the project by proposed **FACILITY DESIGN** Condition of Certification **GEN-1**, **GEN-5** and **CIVIL-1** must present geotechnical engineering design recommendations that will also mitigate these potential geologic hazards to a less than significant level.

There are no known viable geologic or mineralogical resources at the proposed LEC project site. No known paleontological sites are present within one mile of the proposed project site or its linears, and the artificial fill and Quaternary age sediments which make up the near-surface formation are unlikely to host scientifically significant fossils. Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission (Energy Commission) believes that the potential is low for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the LEC project can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS) and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, Energy Commission staff discusses the potential impacts of geologic hazards on the proposed LEC project as well as the project's impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there would be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic,

mineralogic, and palentologic resources, with the proposed conditions of certification. Conditions of certification are conditions with respect to design and/or construction, required of the applicant by the Energy Commission as a part of its approval, which outline required procedures to mitigate impacts to potential resources and potential impacts to the facility from geologic hazards.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Applicable laws, ordinances, regulations, and standards (LORS) are listed in the application for certification (AFC) (NCPA 2008a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
	The proposed LEC project is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), sections 2621–2630	The act mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, PRC sections 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	The code regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	The act mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
2007 California Building Code	These codes address the excavation, grading, and earthwork construction, not limited to construction relating to earthquake safety and seismic activity hazards.
County of San Joaquin General Plan (1992),	The section requires a general plan for long-term development. Under this plan, paleontological resources shall be protected and preserved.

SETTING

The proposed LEC project would involve construction of a 296-megawatt (MW) natural gas fired combined cycle power plant. The LEC project would occupy approximately 2.6 acres of a 4.4-acre fenced site adjacent to the City of Lodi White Slough Water Pollution Control Facility in an unincorporated portion of San Joaquin County southwest of Lodi, California. Construction would require installation of a Siemens STG6-5000 natural-gas fired combustion turbine generator (CTG), a Siemens SST-9000RH single condensing steam turbine generator (STG), a de-aerating surface condenser, a mechanical draft cooling tower, and associated ancillary equipment. A new 2.5-mile gas pipeline will provide fuel for the CTG. Power will be transmitted to the grid via a new 520-foot above-ground power line which will connect the plant to an existing switchyard. New on-site potable water supply and waste water injection wells will also be constructed, as will a recycled water pipeline and connection to existing sanitary sewer.

REGIONAL SETTING

The LEC site is located in northwest San Joaquin County, California, just east of the San Joaquin/Sacramento deltas and approximately 20 miles east of the boundary between the Coast Ranges and the Great Valley (Central Valley) physiographic provinces. The Great Valley is approximately 400 miles long and 60 miles wide, bounded on the north by low-lying hills; on the northeast by the volcanic plateau of the Cascade Range; on the west by the Coast Ranges; on the east by the Sierra Nevada; and on the south by the Coast Ranges and the Tehachapi Mountains. The northern third of the valley is known as the Sacramento Valley, while the southern two-thirds are known as the San Joaquin Valley. The Great Valley is characterized by dissected uplands and relatively undeformed low alluvial plains and fans, river flood plains and channels, and lake bottoms. In the late Cenozoic era, much of the San Joaquin Valley was occupied by shallow brackish and freshwater lakes which left behind fine grained lakebed deposits surrounded by coarser sediments of fluvial and alluvial origin derived from the surrounding highlands. Much of the valley fill alluvium is underlain by marine and non-marine sedimentary rocks and crystalline basement that have undergone anticlinal and synclinal folding and faulting related to regional tectonism (USGS 1985). This tectonism has been uplifting and tilting the coast ranges since the middle Jurassic period.

PROJECT SITE DESCRIPTION

The LEC project site is located in Section 24, Township 3 North, Range 5 East of Mount Diablo Meridian at approximately 38.09 degrees north latitude by 121.39 degrees west longitude with a site elevation of approximately six feet above mean sea level (msl). The site slopes down to the west at an approximate grade of less than1%.

The site surface is composed of four or more feet of disturbed soil and artificial fill which has accumulated during agricultural and industrial development in the area (NCPA 2008a). Native soil in the project area consists of 2 to 8 feet of loose silty and clayey sands and soft to medium stiff sandy silt and sandy silty clay (NCPA 2008f). These likely correspond to localized overbank and meander deposits of the Mokelumne River (USGS 1979). These river deposits are underlain by alternating layers of medium stiff to hard sandy and silty clays, sandy and clayey silts, medium dense to very dense silty,

clayey, and clean sand which extend to at least 71 feet below surface (NCPA 2008f). These alternating layers of silts, clays, and sands are probably representative of interbedded Mokelumne and Calaveras River deposits and glacial outwash (USGS 1979). The interbedded but unconsolidated alluvium may extend to a depth in excess of 200 feet below surface (USGS 1985). The sedimentary deposits are underlain by Tertiary to Jurassic age sedimentary rocks of the Great Valley Sequence to an approximate depth of 12,000 feet. Mesozoic and Paleozoic age crystalline rocks of basement complex are present below 12,000 feet in depth (USGS 1991).

Historic ground water levels in the site area have varied between 2 and 12 feet below the existing ground surface (NCPA 2008f).

Several active and potentially active faults related to regional strike-slip faulting and compressional tectonics are present within 62 miles (100 kilometers) of the LEC site, and EQFAULT™ Version 3.00 was used to model these potential seismic sources (Blake 2006a). The various faults are listed in **Geology and Paleontology Table 2**, along with the type, orientation (strike), maximum earthquake magnitude, and distance from the project site. The peak acceleration, fault type, and fault class for each fault is also given. The fault locations can be found on the California Division of Mines and Geology Fault Activity Map of California (CDMG 1994) and United States Geological Survey Fault Maps (USGS 2008b). The sense of movement and fault class were derived from the California Department of Conservation Fault Parameters (CDC 2002).

Geology and Paleontology Table 2
Active Faults Relative to the Proposed Lodi Energy Center Site

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike[1]	Fault Class
Great Valley 5	19.7	6.5	0.112	Reverse	B
Great Valley 7	25.5	6.7	0.102	Reverse	B
Mount Diablo (MTD)	28.0	6.7	0.093	Reverse	B
Greenville (GN)	28.1	6.7	0.077	Right lateral – Strike slip	B
Foothills Fault System 1	29.9	6.5	0.082	Normal – Right lateral – Oblique (North)	C
Great Valley 4	31.1	6.6	0.084	Reverse	B
Greenville (GS)	31.6	6.6	0.068	Right lateral – Strike slip	B
Greenville (GS+GN)	31.6	6.9	0.081	Right lateral – Strike slip	B
Greenville (Floating)	31.6	6.2	0.055	Right lateral – Strike slip	B
Concord/GV (CON+GVS)	35.3	6.6	0.062	Right lateral – Strike slip	B
Concord/GV (FLOATING)	35.3	6.2	0.050	Right lateral – Strike slip	B
Concord/GV (CON+GVS+GVN)	35.3	6.7	0.066	Right lateral – Strike slip	B
Concord/GV (CON)	35.3	6.3	0.052	Right lateral – Strike slip	B
Concord/GV (GVS+GVN)	37.7	6.5	0.056	Right lateral – Strike slip	B
Concord/GV (GVS)	37.7	6.2	0.049	Right lateral – Strike slip	B
Foothills Fault System 2	38.2	6.5	0.068	Normal – Right lateral – Oblique (North)	C
Calaveras (Floating)	38.7	6.2	0.047	Right lateral – Strike slip	B
Calaveras (CS+CC+CN)	38.7	6.9	0.069	Right lateral – Strike slip	B
Calaveras (CC+CN)	38.7	6.2	0.048	Right lateral – Strike slip	B

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike[1]	Fault Class
Calaveras (CN)	38.7	6.8	0.064	Right lateral – Strike slip	B
Foothills Fault System 3	42.8	6.5	0.062	Normal – Right lateral – Oblique (North)	C
Concord/GV (GVN)	43.0	6.0	0.039	Right lateral – Strike slip	B
Great Valley 8	46.9	6.6	0.061	Reverse	B
West Napa	47.0	6.5	0.047	Right Lateral – Strike Slip	B
Hayward (HS+HN+RC)	47.3	7.3	0.070	Right Lateral – Strike Slip	A
Hayward (Floating)	47.3	6.9	0.058	Right Lateral – Strike Slip	A
Hayward (HS)	47.3	6.7	0.052	Right Lateral – Strike Slip	A
Hayward (HS+HN)	47.3	6.9	0.058	Right lateral – Strike slip	A
Hayward (HN+RC)	48.4	7.1	0.064	Right lateral – Strike slip	A
Hayward (HN)	48.4	6.5	0.046	Right lateral – Strike slip	A
Calaveras (CS+CC)	50.0	6.4	0.042	Right lateral – Strike slip	B
Calaveras (CC)	50.0	6.2	0.039	Right lateral – Strike slip	B
Calaveras (CS+CC Floating)	50.0	6.2	0.039	Right lateral – Strike slip	B
Hunting Creek - Berryessa	50.8	7.1	0.061	Right lateral – Strike Slip	B
Great Valley 3	52.6	7.4	0.065	Reverse	B
Ortigalita	56.8	7.1	0.056	Right lateral – Strike slip	B
Hayward (RC)	57.0	7.0	0.053	Right Lateral – Strike Slip	A

[1]All faults strike northwest unless otherwise noted.

MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard include evaluating each hazard's potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area and to determine if plant operations could adversely affect any such resources.

Staff reviewed existing paleontologic information and requested records searches from the University of California Museum of Paleontology (at Berkeley) for the area surrounding the site. Site-specific information generated by the applicant for the LEC site was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontologic resources exist in the general area. If such resources are present or likely to be present, conditions of certification outline required procedures to mitigate impacts to potential resources and are proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, foundation settlement and expansive clay soils represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report as required by the CBC (2007). The requirements of the proposed

FACILITY DESIGN Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **FACILITY DESIGN** section should also aid in mitigating these impacts to a less than significant level.

Near-surface geologic units at the project site typically consist of fine grained silty and clayey soils interbedded with silty and clayey sands and clean sands. The geologic units at the site are widespread throughout the northwestern part of the San Joaquin Valley and, as such, are not unique in terms of recreational, commercial, or scientific value. In addition, the project area is not within an area of significant geologic resources according to the San Joaquin County General Plan (1992). Finally, staff reviewed existing documentation that outlines aggregate, oil, geothermal, and natural gas production in the area (CDOGGR 2008). The information provided and the documentation reviewed indicate that the project should not impact, directly or indirectly, available geologic resources.

No known paleontological sites exist within one mile of the project site or its linears (NCPA 2008a) Disturbed sediments and artificial fill which forms the site surface holds no potential to yield scientifically important fossils as they would be out of their natural context from their environment of deposition. For the same reason cuttings produced during water supply and injection well drilling will not yield paleontologically meaningful fossils. Proposed Conditions of Certification **PAL-1** through **PAL-7** are designed to mitigate direct impacts to paleontological resources, as discussed above, to less-than-significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (a paleontologic resource specialist, or PRS).

The proposed conditions of certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse direct or indirect impacts to the project from geologic hazards and to potential geologic, mineralogic, and paleontologic resources from the proposed project is low, assuming the proposed conditions of certification are adopted and enforced.

GEOLOGICAL HAZARDS

The AFC (NCPA 2008a) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards impacting the plant site during its practical design life is low. Geologic hazards, such as strong ground shaking, expansive clay soils, liquefaction and settlement due to loading compressible soils must be addressed in the project geotechnical report per CBC (2007) requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the LEC plant site. Geological information was available from the California Geological Survey (CGS), the CDMG, the USGS, and other government organizations. Since 2002, the CDMG has been known as the CGS.

Faulting and Seismicity

Type A faults have slip-rates of ≥5 millimeters per year (mm/year) and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. Three Type A and 16 Type B faults and fault segments have been identified within 62 miles (100 kilometers) of the proposed LEC Site. The fault type, potential magnitude, and distance from the site were summarized previously in **Geology and Paleontology Table 2**.

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations 2007) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since no active faults have been documented within or near the LEC site, setbacks from occupied structures would not be required.

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG 2003; CGS 2002; and Hart and Bryant 1999). No active faults are shown on published maps as crossing the boundary of new construction at the proposed LEC site or its proposed transmission routes. The nearest major active fault is the Segment 5 of the Great Valley Fault located approximately 20 miles west of the project site (**Geology and Paleontology Table 2**).

Segment 5 of the Great Valley Fault has been mapped approximately 20 miles west of the site and controls the seismic impact to the site (**Geology and Paleontology Table 2**). This fault has been identified as a Type B reverse fault with 15-degree west dip and a slip rate of approximately 1.5 mm/year. The closest Type A fault from the site, the southern segment of the Hayward Fault, is mapped as being more than 26 miles west of the site and as having a slip rate of as much as 9.0 mm/year (CDC 2002).

Based on the geotechnical investigation performed for this project (NCPA 2008a), the site soil class is Class C. The estimated peak horizontal ground acceleration for the LEC site is 0.35 times the acceleration of gravity (0.35g) for a bedrock acceleration based on 2% probability of exceedence in 50 years and 2007 CBC criteria (USGS 2008a).

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The surficial fill layer at the LEC site is underlain by stiff to hard clay and silt soils interbedded with sand-dominated layers (NCPA 2008a). Cone penetrometer testing (CPT) and standard penetration testing (SPT) conducted at the site indicate the subsurface formation is generally medium dense to very dense such that seismic shaking would be unlikely to cause widespread loss of shear strength (NCPA 2008a; NCPA 2008f). However, loose sand layers are present, in addition to a shallow ground water table, and could liquefy when subjected to strong earthquake shaking.

Based on the above information, the site can be characterized as having a moderate potential for liquefaction during a large earthquake; however, this potential impact can be mitigated to less than significant through facility design as required by the CBC (2207) proposed Condition of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Although the LEC site may be subject to liquefaction, the potential for lateral spreading of the site surface during seismic events is considered low since the LEC site is essentially flat.

Dynamic Compaction

Dynamic compaction of soils can occur 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. As the site is underlain by artificial fill of unknown density and some layers of loose sand, these materials could be subject to dynamic compaction during a large earthquake. The project-specific geotechnical report required by the CBC (2007) and proposed Condition of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section will evaluate the dynamic compaction potential of the site, and provide recommendations to mitigate the effects of such conditions, if determined to be present, to a less than significant level.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Based on the density of the silt soils present beneath the LEC site, the site's agriculture history, and historic ground water elevations, the potential for hydrocompaction is considered to be minimal.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. Regional subsidence could occur due to future changes in ground water pumping or development of hydrocarbon reserves. No known subsidence problems exist in the LEC project area per the San Joaquin County General Plan (San Joaquin County 1992), and localized subsidence would likely only result from foundation loading during construction due to the presence of potentially compressible fine grain soils at depth across the site. Recommendations for mitigating the effects of

subsidence due to foundation loads must be provided in the project-specific geotechnical report as required by the CBC (2007) and proposed **FACILITY DESIGN** Conditions of Certification **GEN-1**, **GEN-5,** and **CIVIL-1**. When necessary, mitigation is normally accomplished by over-excavation and replacement of the compressible soils for lightly loaded foundations. For heavily loaded foundations, deep foundations are commonly used to support the loads.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, waterline breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. Plasticity index tests, which are also an indicator of the expansive potential and clay content in soils, have not been performed on representative samples of the surficial clay soils at this site. Therefore, recommendations for mitigating the effects of expansive clays soils, if they are exposed during construction, must be provided in the project-specific geotechnical report as required by CBC (2007) requirements and proposed **FACILITY DESIGN** Conditions of Certification **GEN-1**, **GEN-5,** and **CIVIL-1**. When necessary, mitigation is normally accomplished by over-excavation and replacement of the expansive soils beneath structural improvements, although lime treatment of the expansive soils is commonly used beneath pavements.

Landslides

The LEC site is relatively flat, exhibiting an approximate slope of 1% to the west. The flat lying nature and the absence of topographically high ground within or immediately upgradient from the site suggest it is not susceptible to landslide activity.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the LEC site as lying in a Zone A18, or an area of 100 year flood with a base flood elevation and flood hazard factors determined (FEMA 2002). Therefore, the site is considered susceptible to the local 100 year flood event. This potential hazard can be effectively mitigated to less than significant by establishing finished floor elevations above the established flood elevation as required by **FACILITY DESIGN**.

Tsunamis and Seiches

Tsunamis are large-scale, seismic sea waves caused by offshore earthquakes, landslides, and/or volcanic activity. Since the proposed LEC site lies inland more than 90 miles from the Pacific Ocean, potential impacts to the site due to tsunamis is negligible. No large inland surface water bodies capable of producing seiches are located near the proposed plant site. Therefore, the potential for impacts to the LEC site due to seiche activity is negligible.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Based on mapping information developed by the CDC, the LEC site and associated linears do not lie in a designated Mineral Resource Zone (MRZ), defined as areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence (CDC 1988). Energy Commission staff has also reviewed applicable geologic maps and reports for this area (CDC 2006; CDC 1988; San Joaquin County 1992).

Natural gas fields are present approximately 2 miles west and 2-1/2 miles southeast of the project site (CDOGGR 2008); however, no gas production is reported within a mile of the site and three natural gas exploration wells which were drilled within one mile of the site have since been abandoned (CDOGGR 2008).

The site does not lie in a specified MRZ and site-specific exploration did not reveal the presence of any significant amount of potential Portland cement concrete (PCC) aggregate or other economic mineral deposits (NCPA 2008a). No natural gas deposits are known to exist in the site vicinity and given the absence of rock outcrops on or near the site surface, there is very low potential for this site to have economically valuable geologic or mineralogic deposits.

Energy Commission staff has reviewed the paleontological resources assessment contained in the AFC (NCPA 2008a). Staff has also conducted an independent search within the on-line records database maintained by the UCMP (2008a). No known paleontological sites have been recorded within a mile of the site and the uncontrolled fill and Quaternary alluvial deposits which underlie the shallow subsurface hold little promise for production of scientifically significant fossil remains. As a result, the potential to encounter paleontological resources during construction of the LEC project is low, and, any potential impacts to such resources can be effectively mitigated through the Conditions of Certification **PAL-1** through **PAL-7**.

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the project by the CBC (2007) and proposed **FACILITY DESIGN** Condition of Certification **GEN-1** will evaluate and provide standard engineering design recommendations for mitigation of liquefaction, dynamic compaction, excessive settlement due to compressible soils, and expansive clay soils, where appropriate.

Based on site-specific exploration (NCPA 2008a), no viable geologic or mineralogic resources are known to be present at the plant site and are not expected to be present along the proposed transmission line route. The potential to impact significant paleontological resources in Quaternary sediments present at depth is considered to be low. Fill materials have a negligible paleontological sensitivity. Construction of the proposed project will include grading, excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be low in excavations which penetrate through the surficial fill materials and encounter native Quaternary sediments, although the potential for encountering fossils will increase with the depth of cut.

Proposed Conditions of Certification **PAL-1** through **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less-than-significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist, or PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on-site monitoring. During the monitoring, the PRS can and often does petition the Energy Commission for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, and field surveys, performed for the LEC project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the site during the project life and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, dynamic compaction, expansive soils, and foundation settlement due to compressible soils can be effectively mitigated through facility design (see proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **FACILITY DESIGN** section) to the degree that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts correspond to a proposed project's potential incremental effect, together with other closely related past, present, and reasonably foreseeable future projects whose impacts on geologic, mineralogic, and paleontologic resources may compound or increase the incremental effect of the proposed project on such resources.

Potential cumulative effects, as they pertain to geologic hazards, are essentially limited to regional subsidence due to ground water withdrawal. As this project will not involve pumping of large volumes of ground water, the proposed LEC project will not contribute to any increase of this potential hazard. Since heavily loaded foundations will most likely include deep foundations to mitigate potential settlement due to foundation loads, potential effects due to regional subsidence under such conditions would also be effectively mitigated.

No viable geologic resources have been identified in the vicinity of the project site (NCPA 2008a).

No paleontological resources have been identified within one mile of the proposed project site or its linears. Because the value of paleontological resources is associated with their discovery within a specific geologic host unit, the uncontrolled fill and Quaternary younger alluvial deposits which form the shallow subsurface hold little promise for production of scientifically significant fossil remains. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-7**. Implementation of these conditions should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved.

Based on the above discussion, staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards during the project's design life is low and that the potential for impacts to geologic, mineralogic, and paleontologic resources is also low.

Based upon the literature and archives search, and field surveys, performed for the LEC project, the applicant proposes monitoring and mitigation measures for construction of the project. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels less than significant.

The proposed conditions of certification allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology at this time.

CONCLUSIONS

The applicant will be able to comply with applicable LORS, provided that the proposed conditions of certification are adopted and enforced. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **FACILITY DESIGN** section. Proposed paleontological conditions of certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources during plant and project linear construction is low. Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative, deep excavations to fully understand site stratigraphy.

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 keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in california and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of 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 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's 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 plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds 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. Before work commences 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 the following week and 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 five days of identifying the changes.

PAL-3 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted, 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 the basis of discussion when 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 PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted then, prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of a CPM-approved video or in-person presentation. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect these 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 for project sites containing units of high paleontologic sensitivity;

3. Information that the prs or prm has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the prs or prm;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A weap certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

(1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers 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 to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

(4) In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time

monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keeps a daily monitoring log 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 notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. 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, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or 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 project construction.

Verification: The project owner shall maintain in his/her 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 project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying 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 submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Lodi Energy Center (08-AFC-10)

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, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature: _____ Date: ___/___/___

PaleoTrainer: _____ Signature: _____ Date: ___/___/___

Biological Trainer: _____ Signature: _____ Date:___/___/___

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POWER PLANT EFFICIENCY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The Lodi Energy Center (LEC), if constructed and operated as proposed, would generate up to 296 megawatts (MW) (net output) of electricity at an overall project fuel efficiency up to 56% lower heating value (LHV) at annual average ambient conditions. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

INTRODUCTION

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed LEC, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the LEC's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- Examine whether the facility would likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures could eliminate those adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

NCPA, the applicant, proposes to build and operate the LEC, a 296 MW (net output) power plant, to serve California's energy needs (NCPA 2008a, AFC §§1.2, 2.1). The project would consist of one combined cycle power train.

The plant would employ Siemens' "Flex Plant 30" technology, which consists of one natural gas-fired Siemens STG6-5000F combustion gas turbine generator with an evaporative inlet air cooling system and dry low-NOX combustors to control air

emissions; one 3-pressure heat recovery steam generator (HRSG), a selective catalytic reduction unit (SCR) and a CO catalyst to further control air emissions; one Siemens SST-900RH condensing steam turbine generator; one natural gas-fired auxiliary boiler; and one 7-cell mechanical draft evaporative cooling tower (NCPA 2008a, AFC §§ 1.1, 1.1.1, 2.0, 2.1.4, 2.1.6.1, 2.1.6.2, 2.1.6.2.2, 2.1.9; CH2MHill 2009c §§ 2.0, 2.1.42.1.6.1]).

The LEC would be sited adjacent to an existing NCPA 49 MW STIG (steam injected gas turbine) power plant. Natural gas would be delivered to the LEC via a new 2.5-mile-long gas line that would be connected to an existing PG&E natural gas pipeline (NCPA 2008a, AFC §§ 1.1, 1.1.1, 2.0, 2.1.1, 2.1.8, 2.5.3, 4.0).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE SIGNIFICANCE OF ENERGY RESOURCES

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" (Title 14 CCR §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 the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater) will, by definition, consume large amounts of energy. Under normal conditions, the LEC would burn natural gas at a maximum rate of approximately 2,131 million British thermal units (MMBtu) per hour, LHV, during peak load operation (CH2MHill 2009c § 2.1.8]). This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity would be generated by the LEC at a base load efficiency of approximately 56.0% LHV. This efficiency level compares favorably with the average fuel efficiency of other combined cycle power plants.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (NCPA 2008a, AFC §§ 2.1.8, 2.5.3, 4.0). Natural gas for the LEC would be supplied from Pacific Gas & Electric's (PG&E's) high-pressure natural gas transmission Line #108. The PG&E system draws from extensive supplies originating in the southwest and in Canada, and is capable of delivering the gas that the LEC would require to operate. PG&E has supplied a will-serve letter testifying to this fact (NCPA 2008a, AFC Appendix 2E). This natural gas supply is a reliable source of natural gas for this project. It therefore appears unlikely that the project would create a substantial impact on natural gas supplies.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by PG&E via a new 2.5-mile-long 12-inch diameter pipeline connection (NCPA 2008a, AFC §§ 1.1.1, 2.1.8, 2.5.3, 4.0). There appears to be little likelihood that the LEC would require additional capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the LEC or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The LEC could be deemed to create significant adverse impacts on energy resources if alternatives were available that could reduce the project's fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) first requires the examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by both the configuration of the power producing system and the selection of equipment used to generate its power.

Project Configuration

The LEC would consist of one combined cycle power train. Electricity would be generated by one gas turbine and by one steam turbine operating on heat energy recovered from the gas turbine's exhaust (NCPA 2008a, AFC §§ 1.1.1, 2.0, 2.1.4; CH2MHill 2009c §§ 2.0, 2.1.4, 2.1.6.1]). By recovering this heat, which would otherwise be lost up the exhaust stack, the efficiency of any combined cycle power plant is increased considerably from that of either a gas turbine or a steam turbine operating alone. This configuration is well suited to the large, steady loads met by a base load plant that generates energy efficiently over long periods of time.

The applicant proposes to install one Siemens "Flex Plant 30" combined cycle power train. This train would consist of an evaporative inlet air cooler, a Siemens STG6-5000F gas turbine generator with dry low-NOx combustors, a 3-pressure HRSG, a Siemens SST-900RH condensing steam turbine generator, and a 7-cell mechanical draft evaporative cooling tower (NCPA 2008a, AFC §§ 1.1.1, 2.0, 2.1.4, 2.1.6.2, 2.1.6.2.1; CH2MHill 2009c §§ 2.0, 2.1.4, 2.1.6.1]). Staff believes these features would result in meaningful efficiency enhancements to the LEC.

The combined cycle technology proposed for the LEC combines the fast start capability of simple cycle gas turbine technology and the efficiency of combined cycle technology. This technology is designed to start quickly, operating at an efficiency rating comparable to a typical simple cycle plant. Within minutes, the steam turbine generator would begin producing power, aided by the small natural gas-fired auxiliary boiler. The LEC would then operate at a typical combined cycle efficiency rating.

Equipment Selection

The F-class of advanced gas turbines to be installed in the LEC represents one of the most modern and efficient machines available. The applicant would install one Siemens STG6-5000F combustion gas turbine generator (formerly known as the Westinghouse W501F) in a one-on-one combined cycle power train (referred to as the SCC6-5000F) nominally rated at 295.7 MW and 57.0% net plant efficiency LHV under International Organization for Standardization (ISO) conditions (GTW 2009).

One possible alternative is the General Electric Frame 7FA, nominally rated in a one-on-one train combined cycle configuration at 262.6 MW and 56.0% efficiency LHV at ISO conditions (GTW 2009).

Another alternative is the Alstom Power KA24, nominally rated in a one-on-one configuration at 278.9 MW with an efficiency rating of 57.1% LHV at ISO conditions.

Any differences among the SCC6-5000F, the GE 7FA and the KA24 in actual operating efficiency would be insignificant. Selecting among these machines is thus based on other factors such as generating capacity, cost, commercial availability, and the ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

The LEC's objectives include the efficient generation of electricity to serve the energy needs of NCPA's participants, and providing rapid start, operational flexibility and dispatchability (NCPA 2008a, AFC § 1.1.1).

Alternative Generating Technologies

Alternative generating technologies for the LEC are considered in the AFC (NCPA 2008a, AFC §§ 1.4, 6.6). For purposes of this analysis, other fossil fuels, biomass, waste-to-energy, hydroelectric, solar, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, 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 fuel-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 strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines represent the most fuel-efficient electric generating technology available today. Currently available large combustion turbine models can be grouped into three categories: conventional, advanced, and next generation. Advanced combustion turbines have advantages for the LEC. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run times in commercial operations. Emission levels are also proven, and guaranteed emission levels have been reduced based upon the operational experience and design optimization of their manufacturers.

One possible alternative to an advanced F-class gas turbine is the next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which uses partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency diminish, since larger-capacity G-class turbines run at less than optimum (full) output more frequently than smaller-capacity F-class turbines. (Gas turbine efficiency drops rapidly at less than full load.). Given the minor efficiency improvement promised by the G-class turbine, and since this machine would have to operate at less than optimum base load efficiency in order to meet the project load capacity requirements, staff believes the applicant's decision to purchase F-class machines is reasonable.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60% LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application has only recently completed commissioning at the Inland Empire Energy Center in Riverside County, California. Given the lack of commercial experience with this machine and the project load requirements, staff agrees with the applicant's decision to use F-class machines.

Also, the above alternative power generating equipment does not offer the commercially available fast start capability incorporated in the equipment selected for this project.

Capital cost is also important when 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 produced machines that both offer the lowest available fuel cost and sell at the lowest per-kilowatt capital cost.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater power output than the evaporative cooler on hot, humid days; however, it consumes electric power to operate its refrigeration process, slightly reducing its overall net power output and overall efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over another, staff agrees that the applicant's choice of an evaporative gas turbine inlet air cooling system would have no significant adverse energy impacts.

Staff concludes that the selected project configuration (combined cycle) and generating equipment (F-class gas turbines) represents the most efficient feasible combination for satisfying the project's objectives. There are no alternatives that would significantly reduce energy consumption while satisfying the project's objectives of producing base load electricity with rapid start capability.

Staff, therefore, believes that the LEC would not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the LEC to create cumulative impacts on natural gas resources. The PG&E natural gas supply system is adequate to supply the LEC without adversely impacting its other customers.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption), that would not have otherwise occurred without this project. Older, less efficient power plants consume more natural gas than new, more efficient plants such as the LEC. Natural gas is burned by the most competitive power plants on the spot market, and the most efficient plants run the most frequently. The high efficiency of the proposed LEC should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants. The project would therefore not adversely impact the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects to increase power supply to NCPA's participants while adding to dispatchability and rapid start capability. By doing so in a fuel-efficient manner, through installing the most modern F-class gas turbine generator available, the LEC would benefit NCPA's electric consumers.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 296 MW (net output) of baseload electricity at an overall project fuel efficiency of 56.0% LHV at annual average ambient conditions. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CH2MHill 2009c – Supplement D – Changes to Equipment and Project Fenceline, dated July 2009. Submitted to CEC Docket Unit on 07/27/09, tn 52595.

GTW (Gas Turbine World) 2009. Gas Turbine World 2009 GTW Handbook. Volume 27, 2009.

NCPA 2008a – Application for Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

Power 1994. “Operating and Maintaining IPP/Cogen Facilities” Power, September 1994, p. 14.

POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

NCPA, the applicant, predicts an annual availability factor of 93-98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Lodi Energy Center (LEC) would be built and would operate in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (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 reliable power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the **SETTING** section, below).

The scope of this power plant reliability analysis covers:

- Equipment availability;
- Plant maintainability;
- Fuel and water availability; and
- Power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. While the applicant has predicted an annual availability factor of 93-98% for the LEC (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as NCPA or the California Independent System Operator (California ISO), which purchase, dispatch, and sell electricity. How the California ISO and other control area operators ensure system reliability is an ongoing process; protocols are still being developed and put in

place to provide sufficient reliability in the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms that ensure an adequate supply of reliable power.

The California ISO also requires that power plants selling ancillary services, as well as those holding reliability must-run contracts, fulfill certain requirements, including:

- Filing Periodic Reports On Plant Reliability;
- Reporting All Outages And Their Causes; And
- Scheduling All Planned Maintenance Outages With The California ISO.

The California ISO’s mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that individual power plants competing to sell power into the system will exhibit reliability levels similar to those of power plants of past decades. However, there is reason to believe that, with free market competition, financial pressures on power plant owners to minimize their capital outlays and maintenance expenditures may ultimately reduce the reliability of many existing and newly constructed power plants (McGraw-Hill, 1994). It is possible that, if enough power plants exhibit reliability levels sufficiently lower than historical levels, the assumptions used by the California ISO to ensure system reliability could be invalid, causing serious repercussions. Until the state’s restructured competitive electricity market has undergone a shakeout period and the effects of varying power plant reliability are thoroughly understood and compensated for, staff recommends that power plant owners continue to build and operate their projects to the industry’s current level of reliability.

As part of its plan to provide needed reliability, the applicant proposes to operate the 296 megawatt (MW) (net output) LEC, consisting of one combined cycle power train, with operating flexibility and rapid start capability (that is, ability to rapidly start up and provide efficient part load and baseload power). LEC would generate power for use by NCPA’s participants (NCPA 2008a, AFC §§ 1.1.1, 2.3).

The project is expected to achieve an annual availability factor in the range of 93-98% (NCPA 2008a, AFC § 2.5.1; CH2MHill 2009c § 2.3]). The project would be expected to operate at an annual capacity factor between 76% and 82% (NCPA 2008a, AFC § 2.3).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how the project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §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 a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant’s actual ability to

generate power when it is considered to be available, and upon 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, the LEC is expected to operate reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires 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 a project and compares them to industry norms. If they compare favorably for this project, staff will then conclude that the LEC would be as reliable as other power plants on the electric system and would not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adopting appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant, and by providing for the adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a QA/QC program (NCPA 2008a, AFC §§ 2.5.5, 2.5.5.2) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in standard reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility operating in base-load mode for long periods of time must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (NCPA 2008a, AFC §§ 2.1.7.3, 2.1.7.4, 2.1.8, 2.1.9, 2.1.10, 2.1.15.3, 2.5.2; Table 2.5-1; CH2MHill 2009c Table 2.5-1]). All plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. For example, the plant's distributed control system would be built with typical redundancy. Also, emergency direct current and alternating current power systems would be supplied by redundant batteries, chargers, and inverters. Examples of other redundant systems for the balance of plant equipment include:

- Two 100% fuel gas compressors;

- Two 100% capacity feedwater pumps;
- Three 50% capacity condensate pumps;
- Two 100% capacity circulating water pumps;
- Two 100% capacity air compressors; and
- A 7-cell evaporative cooling tower.

Staff believes that the project's proposed equipment redundancy would be adequate for its reliable operation.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant would base the project's maintenance program on those recommendations. The program, consistent with standard industry practices, would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability (NCPA 2008a, AFC § 2.5.1).

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

The LEC would burn natural gas delivered through a new 2.5-mile-long natural gas pipeline that would be connected to the existing PG&E natural gas transmission Line #108 (NCPA 2008a, AFC §§ 2.1.8, 2.5.3, 4.0). PG&E has supplied a will-serve letter indicating its willingness to provide a reliable source of fuel to the project (NCPA 2008a, AFC Appendix 2E). PG&E's natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Southwest, the Rocky Mountains, and Canada. Staff agrees with the applicant's claim that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The project would use an evaporative cooling tower to cool the steam turbine's condenser. The LEC would use recycled water delivered from the adjacent City of Lodi's White Slough Water Pollution Control Facility for the project's process and cooling water uses (NCPA 2008a, AFC §§ 1.1, 1.1.1, 2.1.10, 2.5.4). A will-serve letter from the City of Lodi verifies that adequate recycled water for the project will be made available (NCPA 2008f). Potable water would be supplied by a new on-site well. Staff believes these sources represent a reliable supply of water for the project. 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) are not likely to present hazards for this project, but seismic shaking (earthquakes) and flooding could present credible threats to the project's reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (NCPA 2008a, AFC §§ 2.4.1.1, 2.4.1.2; Appendix 2C); see the "Faulting and Seismicity" portion of the **GEOLOGY AND PALEONTOLOGY** section of this document. The project would be designed and constructed to the latest appropriate LORS (NCPA 2008a, AFC Appendix 2C). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been periodically and continually upgraded. Because it would be built to the latest seismic design LORS, this project would 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 the section of this document entitled **FACILITY DESIGN**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during seismic events.

Flooding

The project site lies within the 100-year floodplain (NCPA 2008a, AFC § 2.4.1.2). The project would be designed to the latest applicable codes and standards regarding flood control (see the section of this document entitled **FACILITY DESIGN)**.

Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **SOIL AND WATER RESOURCES**, and **GEOLOGY AND PALEONTOLOGY**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [http://www.nerc.com]. The NERC reported the following generating unit statistics for the years 2002 through 2006 (NERC 2007):

For combined-cycle units (all MW sizes):

Equivalent Availability Factor = 86.52%

The project's gas turbine has been on the market for many years now and is expected to exhibit typically high availability. The applicant's expectation of an annual availability factor of 93-98% (NCPA 2008a, AFC § 2.5.1) appears reasonable when compared with NERC figures for similar plants throughout North America (see above). In fact, this machine can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up NERC statistics. The applicant's estimate of plant

availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would enhance power supply reliability in the NCPA service area by providing operating flexibility (that is, the ability to rapidly start up, shut down and turn down).

CONCLUSION

The applicant predicts an equivalent availability factor of 93-98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CH2MHILL 2009**x** — Data Response Set 1A, Responses to CEC Staff Data Requests 1 through 56, dated 02/05/09. Submitted to CEC Docket Unit 02/05/09.

McGraw-Hill 1994 — McGraw-Hill Energy Information Services Group. Operational Experience in Competitive Electric Generation. Executive Report.

NCPA 2008a – Application for Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 f - Data Request Set 1A, Responses to Data Requests #s1-55, Attachment DR38-1, and Interconnection Facilities Study, dated 02/05/09. Submitted to CEC Docket Unit on 02/05/09, tn 50006.

NERC 2007 — North American Electric Reliability Council. 2002–2006 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Lodi Energy Center (LEC) project outlet transmission lines and terminations are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The project interconnection to the grid would not require additional downstream transmission facilities (other than those proposed by the applicant) that require California Environmental Quality Act (CEQA) review.

- The LEC will not cause any new transmission line overloads under normal or contingency conditions but will exacerbate pre-project overloads under both normal and contingency conditions. Both a Pacific Gas and Electric Company (PG&E) transmission upgrade project and generators with higher positions in the California Independent System Operator (California ISO) generator interconnection queue will mitigate the identified overloads. Therefore, there are no adverse impacts to the transmission system that require mitigation that result from the LEC project's integration.
- The existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.
- The proposed interconnecting facilities between the new generator and the Northern California Power Agency (NCPA) Lodi Switching Station, including the step-up transformer, the 230 kV overhead transmission line, and terminations are adequate, and planned in accordance with good utility practices, and acceptable to staff in accordance with engineering LORS.

INTRODUCTION

STAFF ANALYSIS

The Transmission System Engineering (TSE) analysis examines whether the facilities associated with Lodi Energy Center proposed interconnection conform to all of the applicable LORS required for safe and reliable electric power transmission. Additionally, under CEQA, the California Energy Commission (Energy Commission) must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). The Energy Commission must therefore identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are both required for interconnection and represent the "whole of the action."

Energy Commission staff relies upon the interconnecting authority, in this case the California ISO, for the analysis of impacts on the transmission grid from the proposed interconnection, as well as the identification and approval of new or modified facilities downstream that could be required for mitigation. The proposed LEC project would

connect to the NCPA Lodi Switching Station. Power will be distributed via PG&E transmission system and require both analysis by PG&E and approval by the California ISO.

ROLE OF PACIFIC GAS AND ELECTRIC

PG&E is responsible for ensuring electric system reliability on its transmission system with the addition of proposed transmission modifications, and determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards. The California ISO will provide analysis in its Facilities Study, and its approval for the facilities and changes required in its system for addition of the proposed transmission modifications.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO will determine the reliability impacts of the proposed transmission modifications on the PG&E transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariffs, it will determine the need for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. The California ISO will, therefore, perform the Facilities Study (FS), provide its analysis, conclusions, and recommendations, and issue a preliminary approval or concurrence letter to PG&E. On completion of the Facilities Study, the California ISO will provide its conclusions and recommendations, and issue a final approval/disapproval letter for the interconnection of the proposed generation project. If necessary, the California ISO will provide written and verbal testimony on its findings at the Energy Commission hearings.

AGENCY COORDINATION

The LEC project is proposed to construct, own, and operate by NCPA. The project would be located in the City of Lodi. Coordination is required for the NCPA with the impacted agencies and utilities such as Western Area Power Administration, Lodi Electric Utility, California ISO, and PG&E. Conditions of Certification TSE-5 insure coordination with these affected entities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- The North American Electric Reliability Council's (NERC) Reliability Standards for the bulk electric transmission systems of North America provide national policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. The NERC planning standards provide for system performance levels for both normal and contingency conditions. With regard to power flow and stability simulations, while these Standards are similar to NERC/WECC Planning Standards, certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards for Transmission System Contingency Performance. The NERC's planning standards apply not only to interconnected system operation but to individual service areas as well (NERC 2006).

- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the NERC's Reliability Standards to provide the system performance standards used to assess the reliability of the interconnected system. These standards require the uninterrupted continuity of service as their first priority, and the preservation of interconnected operation as their secondary priority. Some aspects of NERC/WECC standards are more stringent or specific than NERC standards alone. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree upon Section I.A of the standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and the loss of load that could occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as the loss of either multiple 500 kV lines along a common right of way, and/or the loss of multiple generators). While controlled loss of generation or load or system separation is permitted under certain circumstances, uncontrolled loss is not permitted (WECC 2002).
- California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction,* specifies uniform requirements for the construction of overhead electric lines. Compliance with this order ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of overhead electric lines, and for the safety of the general public.
- CPUC General Order 128 (GO-128), *Rules for Underground Electric Line Construction,* establishes uniform requirements for construction of underground electric lines. Compliance with this order also ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of underground electric lines, and for the safety of the general public.
- National Electric Safety Code 1999 provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- California ISO Planning Standards also provide standards and guidelines that assure the adequacy, security and reliability during the planning process of the California ISO's electric transmission facilities. The California ISO Planning Standards incorporate both NERC and WECC Planning Standards. With regard to power flow and stability simulations, the California ISO's Planning Standards are similar to those of the NERC and WECC and to the NERC's Planning Standards for transmission system contingency performance. However, the California ISO's standards also provide additional requirements that are not found in the NERC, WECC, or NERC planning standards. The California ISO standards apply to all

- California ISO and Federal Energy Regulatory Commission (FERC) electric tariffs provide guidelines for the construction of all transmission additions and upgrades (projects) within the California ISO-controlled grid. The California ISO also determines the "need" for the proposed project where it will promote economic efficiency and maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides operational review for all facilities that are to be connected to the California ISO grid (California ISO 2003a).

PROJECT DESCRIPTION

The applicant has proposed to interconnect the LEC project to the existing NCPA Lodi Switching Station. The proposed commercial operation would be by first quarter 2012. The proposed LEC project would be a combined-cycle power generating facility located in the City of Lodi, San Joaquin County, California. The project would consist of a natural gas-fired combustion turbine-generator (CTG) and a steam turbine generator (STG). The CTG would generate approximately 200.8 megawatt (MW), and the STG would generate approximately 100.9 MW. With an auxiliary load of 6 MW, the nominal output of the LEC would be approximately 296 MW (NCPA 2008 a**,** section 1.1, section 2.0, CH2MHILL 2009 c, section 2.1.4).

The CTG would connect through an 8,000 Amps circuit breaker and a disconnect switch via a short isolated phase bus duct (8,000 Amps) to the low side of its dedicated 145/193/241 MVA generator step-up (16.5/230 kV) transformer. The STG would connect through a 6,000 Amps circuit breaker and a disconnect switch via a short isolated phase bus duct (6,000 Amps) to the low side of its dedicated 90/120/150 MVA generator step-up (13.8/230 kV) transformer). The high sides of the CTGs and the STG transformers would be connected to a common single bus bar. Through a 1,200 Amps disconnect switch and overhead conductors, the LEC would be connected to the existing NCPA Lodi Switching Station (NCPA 2008 a, section 2.1.7, Figure 3.2-1, CH2MHILL 2009 c, Figure 3.2-1R).

SWITCHYARDS AND INTERCONNECTION FACILITIES

The existing NCPA Lodi Switching Station would be modified to accommodate the addition of the LEC project. A new bay including a 230 kV circuit breaker rated at 2,000 Amps and two disconnect switches each rated at 1,200 Amps would be added to the existing NCPA Lodi Switching Station (NCPA 2008 a, section 2.1.7, NCPA 2008 b, Figure DA 3.0-2).

A single 230 kV transmission line, 1272 kcmil ACSR, would interconnect the LEC to the NCPA Lodi Switching Station. This new overhead line would approximately be 520 feet and would be supported by monopole, single circuit structure. Power would be transmitted to the grid via PG&E Gold Hill – Lodi Stig 230 kV and Lodi STIG – Eight Mile Road 230 kV transmission lines (NCPA 2008 a, section 2.1.7.1, section 3.2, Figure 3.2-2, NCPA 2008 b, Figure DA 3.0-2, NCPA 2008 f).

Compliance with Condition of Certification TSE-5 insure these facilities comply with LORS.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of either a proposed generating unit or transmission facility to the grid, the interconnecting utility (PG&E in this case) and the control area operator (California ISO) are jointly responsible for ensuring the grid's reliability. These entities together determine the project's impact on the transmission system and any needed mitigation measures to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. A Facilities Study is used to determine the impacts of the proposed project on the transmission grid. Staff relies on the study and any review conducted by the California ISO to determine the project's effect on the transmission grid and to identify necessary downstream facilities or indirect project impacts required to bring the transmission system into compliance with applicable reliability standards.

The FS analyzes the grid both with and without the proposed project, under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The study must analyze the impact of the project for the proposed first year of operation, and are thus are based upon a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the California ISO. Generation and transmission forecasts are established by an interconnection queue. The study is focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties.

If the study shows that the interconnection of the project could cause the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by the California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as the "whole of the action," the Energy Commission must then analyze the environmental impacts of these modifications or additions.

CALIFORNIA INDEPENDENT SYSTEM OPERATOR STUDY

The California ISO has performed the Facilities Study with the System Impact Study elements and proposed mitigation measures included in the report.

FACILITIES STUDY REPORT

The FS was performed by California ISO at the request of the project owner, to identify transmission system impacts caused by the LEC project on PG&E's 230 kV and 115 kV transmission systems. The FS was based on adding a generation plant with a net output of 280 MW to the California ISO controlled grid. The FS included Power Flow Analysis, Short Circuit Analysis, System Protection and Substation Evaluation, Reactive

Power Deficiency Analysis, and Dynamic Stability analyses. The base cases included all planned generating facilities in PG&E's service territory, whose on-line schedules are either concurrent with or precede the proposed project. Detailed study assumptions are described in the FS. Power Flow studies were conducted both with and without the LEC project connection to the PG&E grid, at the NCPA Lodi Switching Station using full loop base cases modeling 2012 summer peak and summer off-peak conditions. The Power Flow study assessed the project's impact on the thermal loading of the transmission lines and equipment using the 2012 summer peak full loop and summer off-peak full base cases. Dynamic Stability analyses were conducted using the 2012 summer peak full loop base cases to determine whether the project would create instability in the system following certain selected outages. The Short Circuit study was conducted with and without the project to determine if its interconnection could overstress the existing substation facilities (NCPA 2008 f, Section 4, 5).

Power Flow Study Results and Mitigations

The Power Flow Study identified pre-project overload criteria violations under the 2012 summer peak and summer off-peak conditions. Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the California ISO's generator interconnection queue. The study concludes that the addition of the LEC would cause a number of pre-existing normal and/or emergency overloads to increase. However, the addition of the project did not result in new overloads. Pre-project overloads would be mitigated by either PG&E or generators with higher positions in the California ISO generator interconnection queue. Section 7 of the FS summarized the system conditions and mitigation measures required for interconnect the project to the PG&E transmission grid (NCPA 2008 f, Section 7).

Under normal conditions:

- The Power Flow Study indicated the addition of the LEC would not cause any new overloads under normal operating conditions. The overload on the Warnerville-Wilson 230 kV line has an existing overload of 109%. The addition of the LEC would exacerbate this overload. Pre-project overloads would be mitigated by either PG&E or generators with higher positions in the California ISO generator interconnection queue. No mitigation is required for the LEC.

Under N-1 contingency conditions:

- Placer – Gold Hill #2 115 kV line (Gold Hill – Horseshoe 2): This line is overloaded to 100% before the addition of the LEC. Addition of the LEC will increase the overload to 101% under N-1 contingency condition.

  Mitigation:

  - The California ISO has approved the PG&E T444 transmission upgrade project. The 16 mile-long 115 kV double circuit line will be reconductored with 477 kcmil ACSS conductor. This PG&E transmission upgrade project will mitigate both of pre-project overload and increased overload caused by addition of the LEC. No mitigation is required for the LEC.

Table 7-2 listed two other overloaded transmission lines under N-1, and table 7-3 listed six overloaded transmission line under N-2 contingency conditions. All these line

overloads exist before the addition of the LEC. These pre-project overloads would be mitigated by either PG&E or generators with higher positions in the California ISO generator interconnection queue. No mitigation is required for the LEC.

Short Circuit Study Results and Substation Evaluation

Short Circuit Study was conducted to determine the degree to which the addition of the LEC project increases fault duties at PG&E's substations, adjacent utility substations, and other 500 kV, 230 kV, 115 kV, and 60 kV busses within the study area. The busses at locations where faults were simulated, the maximum three phase and single line-to-ground fault currents at these busses, both with and without the project, and information on the breaker duties at each location are summarized in Table 8-1 (Short Circuit Study Results). The Short Circuit Study and Substation Evaluation show that addition of the LEC would not cause overstressed breakers or other equipment. The existing breakers are adequate enough to withstand any post project incremental fault currents identified in the Short Circuit study (NCPA 2008 f, Section 8, Section 12).

Reactive Power Deficiency Analysis

Reactive Power Deficiency analysis determined that the addition of the LEC would not contribute to any reactive power margin violations at PG&E buses following selected N-1 and N-2 contingencies (NCPA 2008 f, Section 10).

Dynamic Stability Study Results

Dynamic Stability Study for the LEC project was conducted using 2012 summer peak full loop base case to determine if the project would create any adverse impact on the stable operation of the transmission grid in the event of selected N-1 and N-2 outages. The results indicate there are no adverse impacts on the stable operation of the transmission system following these selected disturbances, as shown in the FS for integration of the project (NCPA 2008 f, Section 11).

COMPLIANCE WITH LORS

The Facilities Study indicates that the project interconnection would comply with all NERC/WECC planning standards and California ISO reliability criteria. The applicant will design, build, and operate the proposed 230 kV overhead transmission line. Proposed modifications to the NCPA Lodi Switching Station would be performed by NCPA. Staff concludes that, with implementation of the proposed conditions of certification, the project will meet the requirements and standards of all applicable LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE have been received.

CONCLUSIONS AND RECOMMENDATIONS

The proposed LEC project outlet transmission lines and terminations are acceptable and would comply with all applicable LORS. The project interconnection to the grid

would not require additional downstream transmission facilities (other than those proposed by the applicant) that require CEQA review.

- The LEC will not cause any new transmission line overloads under normal or contingency conditions but will exacerbate pre-project overloads under both normal and contingency conditions. Both a PG&E transmission upgrade project and generators with higher positions in the California ISO generator interconnection queue will mitigate the identified overloads. Therefore, there are no adverse impacts to the transmission system that require mitigation that result from the LEC project's integration.
- The existing breakers are adequate to withstand the post project incremental fault currents described in the Short Circuit Study.
- The proposed interconnecting facilities between the new generators and the NCPA Lodi Switching Station, including the step-up transformer, the 230 kV overhead transmission line, and terminations are adequate, and planned in accordance with good utility practices, and acceptable to staff in accordance with engineering LORS.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall provide the Compliance Project Manager (CPM) and the Chief Building Official (CBO) with a schedule of transmission facility design submittals, a master drawing list, a master specifications list, and a major equipment and structure list. The schedule shall contain both a description and a list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or fewer, if mutually agreed upon by the project owner and the CBO) before the start of construction, the project owner shall submit the schedule, a master drawing list, and a master specifications list to both the CBO and the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with both CPM and CBO approval. The project owner shall provide schedule updates in the monthly compliance report.

Table 1: Major Equipment List
Breakers
Step-up transformer
Switchyard
Busses
Surge arrestors
Disconnects
Take-off facilities
Electrical control building
Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 Before the start of construction, the project owner shall assign to the project an electrical engineer and at least one of each of the following:

A. A civil engineer;

B. A geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering;

C. A design engineer who is either a structural engineer or a civil engineer and fully competent and proficient in the design of power plant structures and equipment supports; or

D. A mechanical engineer (business and professions code sections 6704 et seq. Require state registration to practice as either a civil engineer or a structural engineer in California).

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers as long as each engineer is responsible for a particular segment of the project, e.g., proposed earthwork, civil structures, power plant structures, or equipment support. No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical, or civil and design engineer, assigned as required by Facility Design Condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO, for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the

CBO's approval of the new engineer. This engineer shall be authorized to halt earth work and require changes; if site conditions are unsafe or do not conform with the predicted conditions used as the basis for design of earth work or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet, and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or fewer if mutually agreed to by the project owner and the CBO) before the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (2001 California Building Code, Chapter 1, section 108.4, approval required; Chapter 17, section 1701.3, *Duties and Responsibilities of the Special Inspector;* Appendix Chapter 33, section 3317.7, *Notification of Noncompliance*). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and refer to this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for the disapproval, along with the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any construction until plans for that increment of construction have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the monthly compliance report:

A. Receipt Or Delay Of Major Electrical Equipment;

B. Testing Or Energization Of Major Electrical Equipment; And

C. The Number Of Electrical Drawings Approved, Submitted For Approval, And Still To Be Submitted.

Verification: At least 30 days (or fewer if mutually agreed to by the project owner and the CBO) before the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all applicable LORS, and send the CPM a copy of the transmittal letter in the next monthly compliance report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO.

A. The LEC project will be interconnected to the NCPA Lodi Switching Station via a single 230 kV transmission line, approximately 520 feet long, with 1272 kcmil ACSR, Bittern conductor or conductor with a higher rating.

B. The existing NCPA Lodi Switching Station will require a new 230 kV, 2000 Amps breaker, two 1200 Amps disconnect switches, and associated protective relays to facilitate interconnection of the project.

C. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.

D. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

E. 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.

F. The project conductors shall be sized to accommodate the full output of the project.

G. Termination facilities shall comply with applicable PG&E interconnection standards.

H. The project owner shall provide to the CPM:

1) The updated final Detailed Facility Study (DFS), if any, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable;

2) Executed project owner and California ISO facility interconnection agreement.

I. A request for minor changes to the facilities described in this condition may be allowed if the project owner informs the CBO and CPM and receives approval for the proposed change. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

J. Provide evidence showing coordination with the affected agencies and utilities including but not limited to Western Area Power Administration and Lodi Electric Utility.

Verification: At least 60 days before the start of construction of transmission facilities (or fewer days if mutually agreed upon by the project owner and CBO), the project owner shall submit to the CBO for approval:

A. Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;

B. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

C. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through j), above;

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

D. The final DFS, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM;

E. At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to the facilities described in this condition and request approval to implement such changes.

TSE-6 The project owner shall provide the following notice to the California ISO prior to synchronizing the facility with the California electric transmission system:

A. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO with a letter stating the proposed date of synchronization; and

B. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO's outage coordination department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week before initial synchronization with the grid. The project owner shall contact the California ISO's outage coordination department (Monday through Friday, between the hours of 7:00 a.m. and 3:30 p.m. at (916) 351-2300) at least one business day prior to synchronizing the facility with the grid for testing. A report of that conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California electric transmission system for the first time.

TSE-7 The project owner shall be responsible for inspection of the transmission facilities during and after project construction, and for any subsequent CPM- and CBO-approved changes, to ensure conformance with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards. In cases of non-conformance, the project owner shall inform the CPM and CBO, in writing and within 10 days of the discovery of such non-conformance, and the actions that will be taken to correct it.

Verification: Within 60 days after the first synchronization of the project, the project owner shall transmit to the CPM and CBO:

A. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in charge. A statement verifying conformity with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards;

B. An “as built” engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in charge or an acceptable alternative verification. “As built” drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit, as set forth in the compliance monitoring plan;

C. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

California ISO 1998a – California ISO tariff scheduling protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO 1998b – California ISO dispatch protocol posted April 1998.

California ISO 2002a – California ISO Grid Planning Standards, February 2002.

California ISO 2003a - California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March 11, 2003.

CH2MHILL 2009 c - Supplement D - Changes to Equipment and Project Fenceline, dated July 2009. Submitted to CEC Docket Unit on 07/27/09, tn 52595

NCPA 2008 a - Application For Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

NCPA 2008 b - Data Adequacy Response, Supplement B, dated 10/08. Submitted to CEC Docket Unit on 10/24/08, tn 48760.

NCPA 2008 f - Data Request Set 1A, Responses to Data Requests #s1-55, Attachment DR38-1, and Interconnection Facilities Study, dated 02/05/09. Submitted to CEC Docket Unit on 02/05/09, tn 50006.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2002. NERC/WECC Planning Standards, August 2002.

DEFINITION OF TERMS

AAC	All aluminum conductor.
ACSR	Aluminum conductor steel-reinforced.
ACSS	Aluminum conductor steel-supported.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.
Congestion Management	A scheduling protocol that ensures dispatched generation and transmission loading (imports) will not violate criteria.
Double Contingency	Also known as emergency or N-2 condition, occurs when a forced outage of two system elements occurs -- usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Emergency Overload	See Single Contingency condition. This is also called an N-1.
Kcmil or KCM	Thousand circular mil. A unit of the conductor's cross sectional area; when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Loop	An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
Megavar	One megavolt ampere reactive.

Megavars	Mega-volt-ampere-reactive. One million volt-ampere-reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt	A unit of apparent power, equals the product of the line voltage in
Ampere (MVA)	kilovolts, current in amperes, the square root of 3, divided by 1,000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.
N-0 Condition	See Normal Operation/Normal Overload, below.
Normal Operation/ Normal Overload (N-0)	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
N-1 Condition	See Single Contingency, below.
N-2 Condition	See Double Contingency, above.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities with the main grid.
Power Flow Analysis	A power flow analysis is a forward-looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers, and other equipment and system voltage levels.
Reactive Power	Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme	A remedial action scheme is an automatic control provision that, as one example, will trip a selected generating unit when a circuit overloads.
SF6	Sulfur hexafluoride is an insulating medium.
Single Contingency	Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
Special Protection	Detects a transmission outage (either a single or credible

Scheme/System	multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.
Switchyard	A power plant switchyard is an integral part of a power plant that is used as an outlet for one or more electric generators.
Thermal Rating	See ampacity.
TSE	Transmission System Engineering.
Tap	A transmission configuration that creates an interconnection through a short single circuit to a small or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Testimony of Rod Jones

SUMMARY OF CONCLUSION

In compliance with the California Environmental Quality Act, California Energy Commission staff evaluated the alternatives sites and generation alternative technologies discussed in Section 6.0 of the Application for Certification (AFC) for the proposed Lodi Energy Center (LEC). As stated in Section 6.3 of the AFC and discussed in this document, alternatives were selected because they could feasibly attain most of the project's basic objectives. Staff concurs with the project's objectives used to select the alternative sites and generation alternatives technologies.

Staff concluded in its analysis of the alternatives to the LEC that there were no appreciable advantages in using the East Turner (Alternative #1), Ripon (Alternative #2) sites or various generation alternative technologies over the LEC project, and therefore there is no need to seek an alternative site or technology for this specific project. Staff further concluded that if the "no project" alternative were selected, there still would be demand for power by NCPA's member participants. The LEC proposes to supply cost-effective and efficient generation which would be a benefit in the long run.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed LEC. The purpose of this alternatives analysis is to comply with state environmental laws by providing an analysis of a reasonable range of feasible alternatives sites which could substantially reduce or avoid any potential significant adverse impacts of the proposed project (Cal. Code Regs., Title 14, section 15126.6; Cal. Code Regs., Title 20, section 1765). In the alternatives section, Energy Commission staff evaluates project objectives, natural gas power plant technologies, renewable alternatives (e.g., wind and solar) and alternatives sites, including the no project site that could reduce or avoid significant impacts.

The Energy Commission does not have the authority to approve alternative technologies, or require the applicant to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of any significant effects of the project. The Energy Commission may only license facilities for which there is an application.

As stated in the Warren Alquist Act, evaluation of alternative sites is not required when a natural gas-fired thermal power plant is (1) proposed for development at an existing, industrial site, and (2) the project has a strong relationship to the existing industrial site {Public Resources Code 25540.6(b). Staff's role as part of the Energy Commission's licensing process is to provide an independent assessment of the project's engineering design and its potential effects on the environment, the public health and safety, and whether the project conforms to all the applicable laws, ordinances, regulations and standards (LORS).

The proposed LEC is not located in federal lands and therefore is not subject to review under the National Environmental Policy Act (NEPA). The proposed project would be erected on land that is owned and incorporated by the city of Lodi. The zoning designation for the project site is Public and Community Facilities (Section 5.6.1.3.2 of the AFC), which allows for the building of a utility facility (e.g., power plant). This zoning designation would also apply to the project's proposed laydown areas and a small portion of the natural gas pipeline that is part of the project site.

The realigned portion of the LEC revised natural gas pipeline (1.1 miles between N. Thornton Road and N. Devries Road) and would be under the San Joaquin County zoning designation General Agriculture, which allows for utility services.
As stated below, staff also looks at a reasonable range of alternatives to the proposed project.

CALIFORNIA ENVIRONMENTAL QUALITY ACT CRITERIA

Energy Commission siting regulations require the examination of the "feasibility of available site and facility alternatives to the Applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" (Cal. Code Regs., tit. 20, § 1765).

In addition, the *CEQA Guidelines* require an evaluation 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." (Cal. Code Regs., tit. 14 § 15126.6(a). In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, § 15126.6(e)).

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. *CEQA Guidelines* state that an environmental document does not have to consider an alternative of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative (Cal. Code Regs., tit. 14, § 15126.6(f)(3).

PROJECT DESCRIPTION AND SETTING

The Northern California Power Agency (NCPA) proposes to build and operate the Lodi Energy Center (LEC), a natural gas-fired, combined-cycle nominal 296 megawatt (MW) generation facility, located on 4.4 acres of land owned and incorporated by the city of Lodi, 6 miles west of the Lodi city center. The site is located near Interstate-5 (I-5) approximately 1.7 miles south of State Route 12. On the east side of the site is the city of Lodi's White Slough Water Pollution Control Facility (WPCF). The WPCF's treatment and holding ponds are located to the north; NCPA's 49-MW Combustion Turbine Project (CTP #2) is located to the west and a 230-kV Pacific Gas and Electric overhead electrical transmission line is aligned further to the west. The San Joaquin County Mosquito and Vector Control facility is to the south. The proposed project would also be

located near the city of Stockton which is approximately 2 miles south. The project site is currently undeveloped and used for equipment storage during upgrades to the WPCF.

If approved, construction of the project would begin in 2010 and would last for 24 months. Full-scale commercial operation could commence by first quarter 2012 (NCPA 2008a, AFC Sections 2.0.1.3; CH2MHILL 2009c sections 2.0).

DETERMINING THE SCOPE OF THE ALTERNATIVE ANALYSIS

The purpose of staff's alternatives analysis is to determine the potential significant impacts of the LEC, if any, and then focus on alternatives that are capable of reducing or avoiding these potential impacts. To prepare this alternative analysis, staff used the methodology summarized below:

- Ascertain and describe the basic objectives of the project;
- Identify any potential significant environmental impacts of the project;
- Identify and evaluate alternative locations or sites and determine whether the environmental impacts of the alternatives are the same, better, or worse than the proposed project;
- If feasible, identify and evaluate technology alternatives to the project which would mitigate impacts; and
- Evaluate the impacts of not constructing the project to determine whether the "no project" alternative is superior to the project as a proposed project.

Because the alternatives must consider the underlying objective of the proposed project, staff analysis focuses on the proposed site, alternatives sites and generation technologies discussed in the AFC. These alternatives for the most part appear to be consistent with applicant's proposed project objectives.

Alternative generation technologies, as discussed in this analysis, include alternatives methods to generate electricity if the proposed project methodology was not available. It does not consider methods that would reduce the demand for electricity.

BASIC OBJECTIVES OF THE PROJECT

The Energy Commission staff has determined the project's primary objectives to be as follows:

- To provide cost-effective and efficient electric generation capacity to NCPA member utilities and other project participants,
- To provide the most efficient power supply available by using natural gas-fired combustion turbine technology capable of supporting the growing power needs of NCPA member utilities and other project participants,
- To locate the project on an industrial site, in close enough proximity to use the existing CTP #2 infrastructures, and

- To use state of the-art technology to provide the operational flexibility and rapid start and dispatch capability, and
- To minimize environmental and air quality impacts.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

During initial review of the LEC project, staff identified several potential environmental concerns in the Issues Identification Report (CEC 2009 a). The areas of concern were biological resources, land use and transmission system design. Staff also learned later that there were potential waste management and cultural resources issues.

BIOLOGICAL RESOURCES

The Biological Resources concerns identified by staff focused on adjacent irrigation canal to the south of the LEC project site, and in one laydown area and the southern end of two other laydown areas that are proposed to be located within the 200-foot giant garter snake habitat buffer[1]. In attempts to address this concern, the applicant has prepared a draft mitigation proposal and a request for a variance that will need to be approved by the San Joaquin Council of Government's (SJCOG) Habitat Technical Advisory Committee (HTRAC).

LAND USE

The land use concern identified by staff involves the applicant's proposed natural gas supply pipeline alignment in which a small portion of it would be constructed and buried in the Kingdon Airport's Runway Transition Zone. The applicant has submitted a request for consistency with SJCOG's Airport Land Use Commission plan for this part of the airport seeking approval of this part of the project.

CULTURAL RESOURCES

Staff has concluded that there are no known cultural resources that the proposed LEC would impact. However staff feels that it needs additional geoarchaological information from the applicant in order to complete its final analysis.

ALTERNATIVES SCREENING CRITERIA

The applicant's justification for wanting to build the LEC as well as selecting the off-site alternatives is based on the criteria in Section 6.3 of the AFC. From a practicality perspective this criteria seems to be suitable and staff has no additional information that would strengthen this criteria.

- Alternatives are located within a NCPA project participant's jurisdiction,
- Alternatives are adjacent to or near high-pressure natural gas transmission lines,

[1] Because the giant garter snake is considered a threatened species, the San Joaquin County "Multi Species Habitat Conservation (MSHCP) requires a 200-foot set back from areas of potential habitat.

- Alternatives are located adjacent to or near water supply for cooling purposes to maximize efficiency,
- Industrial land use designation with consistent zoning,
- Site control readily available,
- Large enough to accommodate the site including construction laydown, and
- Located more than 2,500 feet from the nearest residential area.

ALTERNATIVE SITES IDENTIFIED AND EVALUATED

In evaluating the proposed stated objectives of the applicant for the LEC project it is staff's conclusion that the objectives are reasonable, and allow for potential means of evaluating the project, and alternatives to the project. Staff also believes that the two alternatives that were identified by the applicant for the proposed project site constitute a reasonable range of project alternative sites (See Figure 1, Lodi Site Alternatives). The sites considered are East Turner (Alternative #1) and Ripon (Alternative #2). These were chosen because they closely reflected the project's objectives (e.g., within a NCPA participant's jurisdiction, near natural gas transmission lines, adjacent to water supply in the case of the WPCF, located on industrial land, etc.). Staff did not locate any more feasible sites that reflected smaller potential impacts, or where site control, utility interconnection agreements and zoning issues were not potential impediments to a reasonable schedule for a power plant project. For these reasons, staff feels the two alternative sites selected by the applicant are sufficient.

This section evaluates both off-site alternatives and compares linear connections of each site.

ALTERNATIVE SITE 1: EAST TURNER

Alternative Site 1 is located in the city of Lodi approximately 8 miles northeast of the LEC site near the intersection of North Cluff Avenue and Turner Road. The site is zoned M-2 Heavy Industrial and is approximately 10 acres in size. Currently the site is vacant, and is surrounded to the north, west, and south by industrial facilities and to the east by a residential trailer park. The site would require a 3,200-foot-long natural gas line that would tie into a 6-inch, high-pressure, PG&E gas line to the east of the site. A 12-mile-long process water pipeline would have to be constructed which would tie into the WPCF, requiring additional resource evaluations and cost study.

A 1,900-foot-long electrical transmission line would need to be built to connect to an existing PG&E transmission line to the east, requiring building of a new substation to support the transmission operation. Because the site is not located near an adjacent power plant facility, there would not be a sharing of the ammonia tank, administrative buildings, warehouses, or staff as with the proposed LEC project. Site control via leasing or ownership would need to be addressed by the applicant.

ALTERNATIVE SITE 2: RIPON

Alternative Site 2 is located approximately 28 miles southeast of the LEC project site in the community of Ripon, east of the intersection of South Stockton Avenue and East 4th

Street. It is zoned M-2, Heavy Industrial and located within the city limits of Ripon and is approximately 9.8 acres in size that is currently undeveloped.

Surrounding land uses include the Modesto Irrigation District and PG&E substation, the city of Ripon Wastewater Treatment Plant (Ripon WWTP) is to the south, Highway 99 runs adjacent to the eastern border and several industrial facilities are to the north and south. A 1,600 foot-long industrial water supply connection would be needed to tap into the current pipeline on South Avenue to the west. The site is not located near an adjacent power plant facility, so some of the shared facilities proposed such as an ammonia tank, administrative buildings, and warehouses would not be accessible, and would need to be developed to support a project at this location. Moreover, given that this site is 28 miles from the CTP #2 and too far for staff sharing, additional permanent workers would be needed to support operations and maintenance needs.

A 3,000 foot-long gas line would be needed to access the 12-inch-diameter high pressure gas line located south of the WWTP, a 500-foot long electrical transmission line would need to be built to connect to the existing MID Stockton Substation to the west. If this site were selected there could be control issues from a leasing or ownership perspective (NCPA, 2008a AFC, Section 6.3.3). Table 1 provides a breakdown of key development components associated with the LEC project and alternative sites (such as linear connection, site control, etc.).

Alternatives Table 1
LEC Project /Alternatives Sites

Development Components	LEC Site	Alternative 1 East Turner	Alternative 2 Ripon
Linear Connections	Natural gas = 14,122 feet* Water = Existing pipeline [1] Electrical = 520 feet	Natural gas = 3,200 feet Water = 12 miles Electrical = 1,900 feet	Natural gas = 3,000 feet Water = 1,600 feet[2] Electrical = 500 feet
Site Control (lease or ownership)	Site will be leased from city of Lodi	Unknown	Unknown
Nearest Residential	Approx. 4,400 feet away	Approx. 50 feet away ***	Approx. 650 feet away
Shared Facilities	Yes**	No	No
Zoning	Public Facilities	M-2, Heavy Industrial.	M-2, Heavy Industrial
Close Proximity to freeway	Yes	Yes	Yes
Water Resources for Power Plant Cooling	Would use tertiary-treated water from WPCF	Would use tertiary-treated water from WPCF	Would use non-potable industrial water system west of South Stockton Avenue

Note: Linear connections are in feet and miles and obtained from AFC.
* Based on the route alignment change as noted in Supplement C (NCPA, March 2009).
** Project site that would share staff and infrastructure (i.e., anhydrous ammonia system, administrative building, 230-kilovolt switchyard interconnection etc.) with CTP#2.
*** The East Turner site is located adjacent to a recreational vehicle/trailer park which could potentially make it more difficult to obtain licensing approval.
1 The LEC will receive primarily recycled water provided by the city of Lodi's WPCF for its operation through an existing 48-inch-diameter pipeline in the utility corridor connecting the LEC and WPCF.
2 The city of Ripon WPCF would provide recycled water.

GENERATION TECHNOLOGY ALTERNATIVES

This section considers potential generation technology alternatives to the construction and operation of the proposed LEC. The purpose of this alternatives analysis is to comply with CEQA by providing an analysis of a reasonable range of feasible alternative technologies that could substantially reduce or avoid any potential significant adverse impacts of the proposed project (Cal. Code Regs., Title 14, section 15126.6; Cal. Code Regs., Title 20, section 1765). This sub-section identifies potentially significant impacts of the proposed project and analyzes different technology alternatives that may be used by the applicant in lieu of the proposed project and reduce or avoid significant impacts.

As discussed in Section 6.6 of the AFC, the applicant identified four generation technologies that can utilize natural gas readily available from the existing transmission system. The generation technology alternatives included the following: 1) Conventional boiler and steam turbines, 2) Conventional simple-cycle combustion turbine, 3) Kalina combined-cycle and 4) Internal combustion engines.

The boiler and steam technology alternative despite having a high efficiency when utilizing oil or coal has out-dated technology. Use of oil or coal for fuel to maximize efficiency, will also result in higher levels of criteria pollutants and greenhouse gases being emitted. The Conventional simple-cycle combustion turbine allows for quick start-up of the turbine generators, lower capital costs but provides a low efficiency that emits more air pollutants per kilowatt-hour. The Kalina-combined-cycle has the potential to improve thermal technology but is still considered a developing technology on the commercial market.

The generation technology alternatives, though meeting project objectives have efficiency and reliability challenges, which eliminated them from further consideration. Case in point: The internal combustion engines alternative has high emissions compared to the combined –cycle technology. The Internal combustion technology uses little water which is beneficial from a water preservation perspective. It uses a closed-loop coolant system with radiators and fans, quick start-up capability but with a higher emissions release than the combustion-cycle technology, and would generally be deployed at less than 150 MWs than the proposed LEC project, which is 296 MWs. Table 2 compares the all the proposed generation technology alternatives to the LEC project.

Alternatives Table 2
Comparison of Generation Technology Alternatives and LEC

Technology Alternatives	Description	Pros	Cons
Boiler and Steam Turbine	Conventional boiler	Higher efficiency when utilizing oil or coal	Out-dated technology with low efficiency* and large space requirement
Conventional Simple-Cycle Combustion Turbine	Simple-cycle	Quick start-up capability; lower capital costs; suitable for peaking applications	Low efficiency that emits more air pollutants per kilowatt-hour
LEC	Combined-cycle (natural gas-fired /steam)	Meets project objectives (e.g., quick-start up capability, etc.)	Technology is widely used and requires mitigation
Kalina Combined-Cycle	Combined cycle (ammonia /water mixture in steam cycle)	Has potential to improve thermal efficiency	A developing technology that has not been widely used commercially
Internal Combustion Engines	Internal combustion	Uses very little water; uses a closed-loop coolant system with radiators and fans; quick-start capability*; are responsive load-following needs	Somewhat higher emissions than combustion turbine technology generally deployed at less than 150 MW (less than the LEC which is 255 MW)

Note: Fuel technologies were not considered for evaluation by the applicant because they do not meet the project's objectives.

ADDITIONAL POWER TECHNOLOGIES

Staff looked at renewable alternatives in the area of wind power and solar technologies.

Wind Power Alternatives

The term wind power describes the process by which the wind is used to generate mechanical power or electricity. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity.

The benefits to using the wind power alternative technology as oppose to a fossil fuel project is that wind power conserves water, reduces greenhouse gas emissions, and reduces the demand for natural gas. However, the proposed LEC site seems to be suited for a natural gas-fired project more than a potential wind farm in that the site is close to linear connections, near the existing CTP #2 facility, and is flat. Whereas wind

farms are typically located on hilly or mountainous land where there is a steady state of wind (e.g., Altamont Pass in the Diablo and Livermore Valleys along Interstate 580 in Alameda County).

Moreover, the 4.4 acre LEC site would be unable to accommodate the number of wind turbines needed to generate 296 megawatts of power. For example, most manufacturers of utility-scale turbines offer machines in the 700-kW to 2.5-MW range. Ten 700-kW units would make a 7-MW wind plant, while 10 2.5-MW machines would make a 25-MW facility (USDOE, 2006 & AWEA). The larger turbines that are 3 megawatts are typically located on offshore wind farms. One other challenge to using wind power technology at the proposed project site is that wind can be intermittent and does not always blow when electricity is needed plus there are visual, bird, and noise impact concerns.

Solar Generation

This section looks at solar thermal and photovoltaic technologies. According to the Energy Information Administration, solar power is one of the fastest growing sources of renewable energy worldwide. Two solar power technologies - solar thermal and solar photovoltaic - are widely employed today, and their use is likely to increase in the future. n California where California's electric utility companies are required to use renewable energy to produce 20% of their power by 2010 and 33% by 2020.

Solar thermal technologies produce electricity by concentrating the sun’s heat to boil a liquid and using the steam to rotate a generator turbine, in much the same way that electricity is resulting from steam plants powered by coal or natural gas. There are two main types of solar thermal power plants: towers and parabolic troughs. A solar power tower consists of a large array of sun-tracking mirrors, which are used to reflect the sun’s rays onto a central tower. When the rays hit the tower’s receiving panel, their heat is transferred to a fluid medium that is boiled to produce steam. Solar power towers have been demonstrated successfully and the Energy Commission is reviewing a full scale proposal, the Invanpah (07-AFC-05).

Solar photovoltaic technologies convert sunlight directly into electricity by using photons from the sun’s light to excite electrons into higher states of energy. The resultant voltage differential across cells allows for a flow of electric current. Because individual solar cells are very small and produce a few watts of power at most, they are connected together in solar panels that can be arranged in arrays to increase electricity output. The arrangement of arrays is one major advantage of photovoltaic technologies, because they can be made in virtually any size to fit a specific application (Energy Information Administration - Solar Photovoltaic and Solar Thermal Electric Technologies, International Energy Outlook 2009).

Solar Thermal Technology

The pros of solar thermal systems are:

- They are clean (no air emissions) and renewable;
- It is tied to tax incentives;

- Cooling requirements are lower than for solar thermal, so it can result in lower water use;
- They usually produce solar power during peak demand for electricity (e.g. summer months); and
- They can work in the shade for brief amounts of time, since the heated fluids they depend on can stay hot enough to generate electricity for some time without the sun.

The cons of solar thermal systems are:

- Some of the land potentially available for solar power projects are federally managed by the United States Bureau of Land Management (BLM), BLM's mandate to accommodate multiple uses when possible may make it more challenging to develop and operate a solar project;
- Some solar thermal projects rely on water cooling technology which could present a problem if built in locations where there are water restrictions;
- The distance to suitable transmission system interconnection locations may be a challenge;
- It can take a large area to produce the energy needed;
- It produces no energy at night; and
- Just as costly to build as a fossil fuel project.

Photovoltaic Technology

The pros of solar photovoltaic technology are:

- It is sustainable;
- It is well suited to providing power in home or single buildings;
- It is a proven technology;
- It is essentially non-polluting; and
- It is fairly low maintenance.

The cons of solar photovoltaic technology are:

- It is more expensive at the current time;
- It produces less energy on cloudy days and/or at, higher latitudes;
- It produces no energy at night; and
- An energy storage device is required.

THE "NO PROJECT" ALTERNATIVE

CEQA's "no project" alternative assumes that the project is not constructed. In the CEQA analysis, the "no project" alternative is compared to the proposed project and a determination is made regarding whether"no project" is superior, equivalent, or inferior to the proposed project. 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., Title, section 15126.6(i)).

Both CEQA Guidelines and Energy Commission regulations require consideration of the “no project” alternative. Essentially, the no-action alternative provides a baseline against which effects of the proposed action (construction and operation of the LEC at the proposed location) may be compared. The site specific and direct impacts associated with the LEC would not occur if the “no project” alternative is selected and therefore no impacts would occur at this site as a result of the proposed LEC.

If the “no project” alternative is adopted, NCPA would not receive a license from the Energy Commission to build and operate a new power generation facility (the LEC), and NCPA would fail to meet its stated objectives of providing dispatchable rapid start, highly efficient and reliable electrical capacity, grid system for its members. However, as highlighted in the Project Objectives - Section 6.1 of the AFC, the primary benefit to the proposed LEC is that it will provide needed electric generation capacity to respond to the demand for electricity… and probably produce electricity more efficiently than other currently generating out-dated power plants.

RESPONSE TO AGENCY AND PUBLIC COMMENT

There were no public comments received regarding alternative sites or technology for the proposed LEC project.

CONCLUSIONS AND RECOMMENDATIONS

As determined in this analysis of the project’s alternatives and generation alternative technologies there would be no appreciable advantages to using the East Turner and Ripon sites or generation alternative technologies over the proposed LEC project primarily because of the LEC’s close proximity to existing infrastructure (near an existing high-pressure natural gas transmission line #108, 230 kV electrical transmission facilities, existing water supply for cooling from the WPCF, ability to share facility resources (staff, administrative buildings, warehouse, etc) location of the existing Combustion Turbine Project #2, and lease agreement with the city of Lodi.

Moreover, the Lodi Energy Center (LEC) would not result in any significant adverse impacts and would comply with applicable laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification and staff’s proposed conditions of certification are implemented. Therefore, there is a not a need to seek an alternative site or technology.

REFERENCES

American Wind Energy Association - Wind Web Tutorial
http://www.awea.org/faq/wwt_basics.html#How%20much%20electricity%20can%20one%20wind%20turbine%20generate

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Energy Information Administration – Solar Photovoltaic and Solar Thermal Electric Technologies, International Energy Outlook 2009, Report #: DOE/EIA-0484(2009), Release Date: May 27, 2009

NCPA 2008 a - Application for Certification (AFC) Volumes I and II, dated 09/10/08. Submitted to CEC Docket Unit on 09/10/08, tn 47973.

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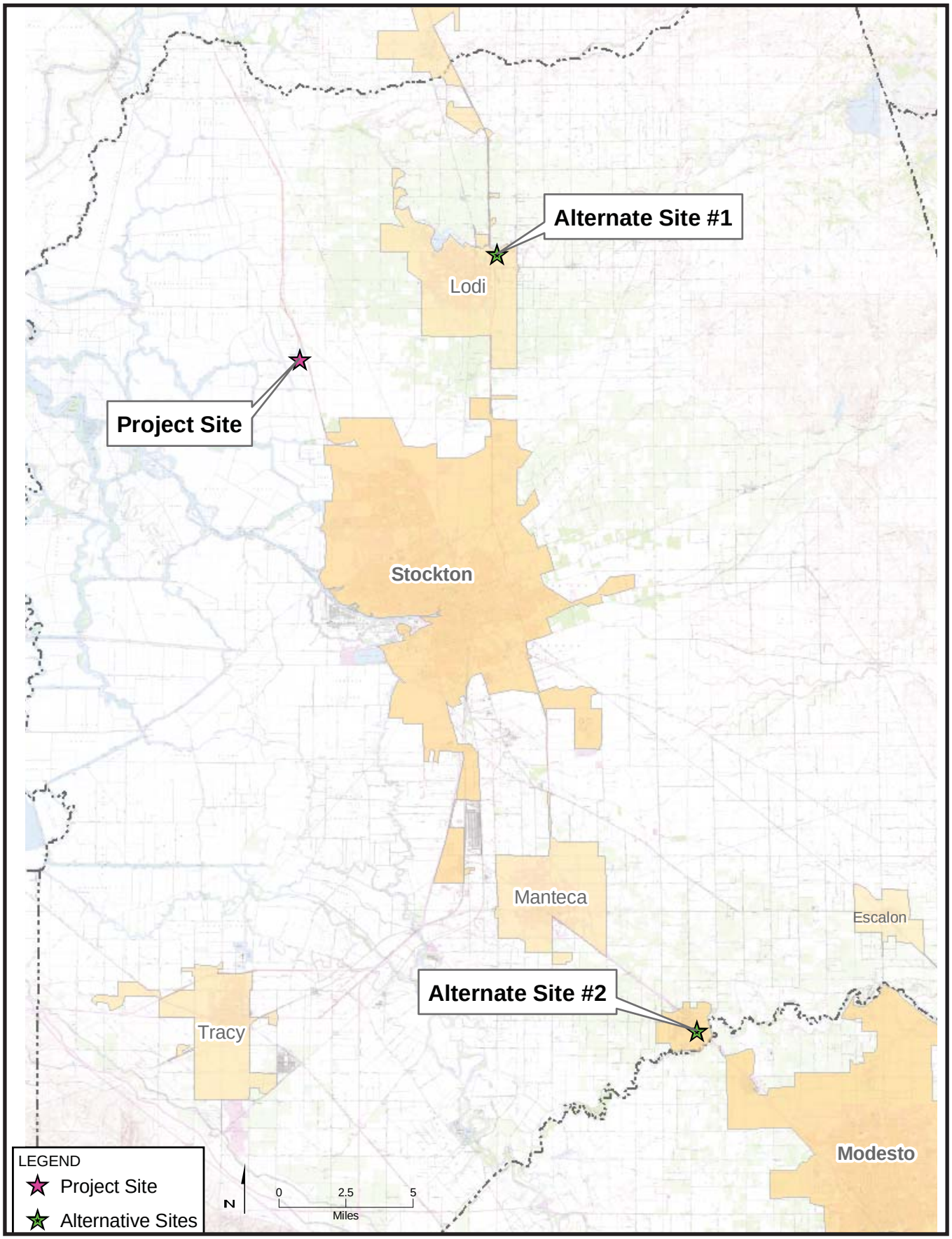
U.S. Department of Energy, Wind and Hydropower Technologies Program, 2006 "How Wind Turbines Work" <http://www1.eere.energy.gov/windandhydro/wind_how.html>

U.S. Department of Energy, Wind and Hydropower Technologies Program, 2006 "Advantages and Disadvantages of Wind Energy" – last updated 11/28/2008 <http://www1.eere.energy.gov/windandhydro/wind_how.html>

ALTERNATIVES - FIGURE 1
Lodi Energy Center - Alternative Site Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 6.3-1

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Angelique Juarez-Garcia

INTRODUCTION

The project's General Compliance Conditions of Certification, 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 public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- Set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- Set forth the requirements for handling confidential records and maintaining the compliance record;
- State procedures for settling disputes and making post-certification changes;
- State the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- Establish requirements for facility closure plans; and
- Specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring and trenching above, construction does **not** include the following:

1. The installation of environmental monitoring equipment;
2. A soil or geological investigation;
3. A topographical survey;
4. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. Any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is 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 (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions)

4. Documenting and tracking compliance filings

5. Ensuring that compliance files are maintained and accessible

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble both the Energy Commission's and 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. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain the following documents and information as a public record, in either the Compliance file or Dockets 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 of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in the Energy Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in the revocation of the Energy Commission certification, an administrative

fine, or other appropriate action. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site 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, documents submitted as verification for conditions, and other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. Appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter**

subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and 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 and CEC submittal number.

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 hardcopy submittals shall be addressed as follows:

Angelique Juarez-Garcia, Compliance Project Manager
(08-AFC-10C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

If the project owner desires Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where

the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. The technical area;
2. The condition number;
3. A brief description of the verification action or submittal required by the condition;
4. The date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. The expected or actual submittal date;
6. The date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. The compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date).
8. If the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include the AFC number and 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 an electronic searchable version 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, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;

3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;

4. A list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. A list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. A cumulative listing of any approved changes to conditions of certification;

7. A listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. A projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. A listing of the month's additions to the on-site compliance file; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the

CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. Documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;

4. A cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. A projection of project compliance activities scheduled during the next year;

8. A listing of the year's additions to the on-site compliance file;

9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. Current Compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission

adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. Identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. Identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. Identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. Address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Staff Approved Project Modifications and Verification Changes (COMPLIANCE-14)

The project owner must file a petition with the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209. 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.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of section 1769 at the time this condition

was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

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 requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template.

Staff Approved Project Modification

After the project owner files a Petition to Amend pursuant to section 1769, as discussed above, the CPM will make a determination whether the petition can be processed as a staff approved project modification pursuant to section 1769 (a)(2). Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts, may be authorized by the CPM as a staff approved project modification. This process usually requires minimal time to complete, and it requires a 14-day public review of the Notice of Petition to Amend that includes staff's intention to approve the proposed project 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.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Process

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 an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. Immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. Secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. Conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;

4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

Condition Number	Subject	Description
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: • Property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • A pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • All pre-construction conditions have been complied with, • The CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee

Condition Number	Subject	Description
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number:
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

LODI ENERGY CENTER PROJECT
PREPARATION TEAM

Executive Summary ..... Rod Jones

Introduction ..... Rod Jones

Project Description ..... Rod Jones

Air Quality ..... Brewster Birdsall & Matthew Layton

Biological Resources ..... Joy Nishida

Cultural Resources ..... Beverly E. Bastian

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

Land Use ..... Amanda Stennick

Noise and Vibration ..... Erin Bright

Public Health ..... Obed Odoemelam, Ph.D.

Socioeconomics ..... Scott Debauche

Soil and Water Resources ..... Paul Marshall

Traffic and Transportation ..... …….David Flores

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Marie McClean

Waste Management ..... Ellie Townsend Hough

Worker Safety and Fire Protection ..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Facility Design ..... Shahab Khoshmashrab

Geology and Paleontology…….. Patrick A. Pilling, Ph.D., P.E, G.E.

Power Plant Efficiency ..... Steve Baker

Power Plant Reliability ..... Steve Baker

Transmission System Engineering ..... Laiping Ng & Mark Hesters

Alternatives ..... Rod Jones

General Conditions ..... Angelique Juarez-Garcia

Project Assistant ..... April Albright

DECLARATION OF
Rod Jones

I, **Rod Jones** declare as follows:

1. I am presently employed by Chambers Group, a contractor to the California Energy Commission Siting, Transmission and Environmental Protection Division as a 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 **(Executive Summary, Introduction, Project Description, and Alternatives)** for the Lodi Energy Center project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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: 11/20/09 Signed: Original signature in Dockets

At: Sacramento, California

Rod Jones

1516 Ninth Street
Sacramento, California

EXPERIENCE

CALIFORNIA ENERGY COMMISSION, SACRAMENTO, CALIFORNIA

2008 – Present

Project Manager Contractor - Siting, Transmission and Environmental Protection Division

Provide support to the Energy Commission's facility licensing process by managing a team of environmental scientists and professionals in conducting environmental review, analyses and document preparation for proposed thermal power plants 50 megawatts or greater in California.

URS CORPORATION, SACRAMENTO, CALIFORNIA 2006 - 2007

Senior Planning Consultant

Oversaw projects involving NEPA/CEQA Environmental permitting; Environmental Impact Report preparation. Military land use planning; Marketing of planning services to internal and external clients.

- Drafted noise section of the Sacramento Municipal Utility District Environmental Impact Report (EIR), Phase III Solano Wind Project, a 4,200 acre site within the Collinsville-Montezuma Hills Wind Resource Area (WRA) in Rio Vista, California
- Managed the permitting of the California Department of Water Resources (DWR) 16 critical levee repair sites
- Obtained permits from the California State Lands Commission and The State Reclamation Board for the DWR emergency repair sites

HIGGINBOTHAM BRIGGS AND ASSOCIATES, COLORADO SPRINGS, COLORADO

2005 - 2006

Military Planning Consultant

Provided military land use planning and design services.

- Prepared area development plans for Nellis Air Force Base, Las Vegas, Nevada which included: Freedom Park, Main Base Town Center and Area III
- Prepared general plan update for Seymour Johnson Air Force Base, Goldsboro, North Carolina
- Designed long-range land use options for the reuse of Seymour Johnson's federal prison camp, F-15 apron expansion, hangar, dental building and bombing range

Rod Jones

1516 Ninth Street
Sacramento, California

AGILENT TECHNOLOGIES, COLORADO SPRINGS, COLORADO

2000-2003

Operations Manager, Colorado Springs Technology Center

Accountable for the on-time deliver of over $2M a month in product while directing the day-to-day operations of 4 departments and 26 direct reports and external contract workers in the manufacturing of application specific integrated circuits (ASICs) used in logic analyzers, oscilloscopes and test systems:

- Created a seamless production environment between departments and shifts by utilizing lean manufacturing/six sigma related techniques
- Managed $500K overhead budget
- Created timelines for delivery of finished product based on daily throughput (work orders completed)
- Utilized PM3000 system (Production Management Resource) as a tool to monitor progress of work flow at work center/operation
- Collaborated with Planning department in assigning priority designation code to products requiring quick delivery (turn around) to customer

Continuous Process Improvement of Manufacturing Departments:

- Collaborated with Process Engineer to improve efficiency of my departments
- Determined where changes should occur (e.g., materials, tools, methodology, equipment) by evaluating standard unit time and cycle time of products being built
- Getting to root cause of failed product by meeting and conferring with cross-function team
- Assembled multi-disciplinary technical team (e.g., Process Engineer, Materials Engineer, Technician and Process Operator) to brain storm production issue(s)
- Requested collection of test data sample work orders from Process Engineer
- Evaluated test data with team do determine appropriate solution and steps

Increased productivity of direct reports by implementing cross training matrix:

- Reviewed work orders late at operation by reviewing production queue
- Tracked work orders for 30 days
- Held meeting with Process Operators, Technicians, Engineers to determine why work orders were late
- Created a paredo list of issues

- Recommended operators receive cross training at key operations
- Scheduled training around production

CITY OF RICHMOND REDEVELOPMENT AGENCY/PLANNING DEPARTMENT, RICHMOND, CALIFORNIA

1990 – 1999

Urban/Environmental Planner

- Managed development of Point Molate Reuse Plan (a former 242 acre Naval Fuel Depot) in support of President Bill Clinton's Department of Defense Base Realignment and Closure program

- Facilitated a 10-member open space and environmental subcommittee in creating reuses for Point Molate. Held weekly working session with subcommittee (which consisted of public at-large, East Bay Regional Park District, U.S. Navy, and Sierra Club representatives)

- Managed the California Advanced Environmental Technology Corporation (CAETC) Hazardous Waste Storage and Transfer Facility expansion; Created and facilitated a Communication and Information Panel to overseer the project and annual community grant program

- Managed downtown commercial building façade improvements to Richmond Enterprise Center, which housed small start-up businesses. Also chaired tenant meetings, resolved tenant disputes

- Prepared downtown commercial building property study including historical properties

- Prepared downtown study which recommended California Main Street Beautification program.

- Served on small business loan committee which provided loans to start-up businesses ($25K to $100K), and consisted of representatives from Wells Fargo Bank and Bank of The West

- Facilitated $1M Economic Development Administration Grant Application for start-up of Biotech Incubator

- Managed EIR for amending Richmond's eleven redevelopment project areas

- Presented proposed planning projects to neighborhood councils, Richmond Chamber of Commerce, Council of Industries, and Richmond downtown business association

- Co-authored an award wining U.S. EPA Brownfiield pilot program grant for the cleanup of contaminated industrial properties in Richmond's south shoreline

- Worked closely with Richmond Chamber of Commerce in implementing a city business retention survey involving more than 100 businesses in Richmond

VOLUNTEER/CERTIFICATION/TRAINING

CITY OF COLORADO SPRINGS ECONOMIC DEVELOPMENT CORPORATION MANUFACTURING TASK FORCE, COLORADO SPRNGS, COLORADO **2003-2004**

Committee Member: Researched and evaluated potential workforce industries to recruit to the Pikes Peak Region

2006 - URS Project Management Certification consisting of the following areas:

- Project Management:
- Planning
- Client Relations
- Contracts and Procurement
- Financial Management

2006 - URS High Performance Leadership Training in the following disciplines:

- Strategic & Tactical Planning
- Developing/Refining Marketing Strategy

EDUCATION

SCHOOL OF POLICY, PLANNING, AND DEVELOPMENT AT USC, LOS ANGELES, CALIFORNIA

1998

M.P.D.S. Community and Economic Development

CALIFORNIA STATE UNIVERSITY EAST BAY, HAYWARD, CALIFORNIA

1989

B.A. Environmental Policy/Land Use Management

DECLARATION OF
James Brewster Birdsall

I, James Brewster Birdsall, declare as follows:

1. I am under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as an Air Quality Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program and the Siting, Transmission, and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality and Greenhouse Gas Emissions** for the Lodi Energy Center project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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 19, 2009 Signed: Original signature in Dockets

At: San Francisco, California

Aspen
Environmental Group

BREWSTER BIRDSALL, P.E., QEP
Senior Associate, Air Quality and Engineering

ACADEMIC BACKGROUND
M.S., Civil Engineering, Colorado State University, 1993
B.S., Mechanical Engineering, Lehigh University, 1991

PROFESSIONAL EXPERIENCE

Mr. Birdsall is an environmental scientist who specializes in air quality and noise analyses for land development related projects and air quality risk assessments. He has nine years of consulting experience with expertise in environmental impact assessment under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and the Clean Air Act. His focus is on air permitting, and air quality and noise-impact modeling, which includes field monitoring for traffic and other community noise sources.

Aspen Environmental Group — 2001 to present

Mr. Birdsall's project experience at Aspen includes the following:

Technical Studies for CEC Contract – Review of Power Plant AFCs. Mr. Birdsall assists the California Energy Commission (CEC) as a technical specialist by reviewing and providing testimony on Applications for Certification (AFC) for new power plants throughout California.

- **Tesla Power Plant.** Lead technical staff for air quality assessment and analyst of visible plumes for new 1,120 MW combined cycle power plant and 11-mile recycled water pipeline in rural eastern Alameda County near Tracy.
- **Inland Empire Energy Center.** Lead technical staff for air quality assessment for new 670 MW combined cycle power plant near Romoland in Riverside County.
- **Palomar Energy.** Lead technical staff for air quality assessment and supporting staff for cooling system studies for new 540 MW combined cycle power plant in northern San Diego County.
- **Kings River Conservation District Peaking Power Plant.** Lead technical staff for air quality assessment of new 97 MW simple cycle power plant in Fresno County.
- **Avenal Energy.** Lead technical staff for air quality assessment and analyst of visible plumes for large new combined cycle power plant near Avenal in Kings County.
- **Blythe Energy Project Phase II.** Lead technical staff for air quality assessment for new 520 MW combined cycle power plant and affiliated 118-mile transmission line, in the Mojave Desert and Coachella Valley of Riverside County.
- **Russell City Energy Center.** Lead technical staff for noise assessment of new 600 MW combined cycle power plant adjacent to shoreline recreational areas in Hayward.
- **Los Esteros Critical Energy Facility.** Lead technical staff for noise assessment and analyst of visible plumes for new 180 MW simple cycle power plant adjacent to recreational areas in San Jose.

- **Environmental Performance Report.** Technical review and editorial assistance for environmental portion of the first Integrated Energy Policy Report for the Governor and Legislature.
- **Air Quality Compliance.** Technical staff for analysis of modifications to permit conditions at the Moss Landing Power Plant. Prepared independent analysis of permit requirements and environmental consequences of increasing the capacity of the Midway-Sunset Cogeneration Project.
- **Alternative Cooling Technology Studies.** Supporting staff for analyses of dry cooling and hybrid cooling alternatives for the Cosumnes Power Plant and Palomar Energy Project. Coordinated and edited documentation from design engineers and other specialists.

For the **California Public Utilities Commission**:

- **San Onofre Nuclear Generating Station and Diablo Canyon Power Plant, Steam Generator Replacement Projects.** Currently serving as Deputy Project Manager for Environmental Impact Reports on the proposed improvements to these controversial nuclear power plants. Preparing certain administrative and technical portions of reports and coordinating the environmental documents with team of analysts.
- **Miguel-Mission 230 kV #2 Transmission Line.** Conducted the air quality and noise review for a system that would reduce transmission constraints between San Diego County and generators within the U.S. and Mexico. Provided oversight of the engineers studying impacts to traffic and transportation and the transmission system design.
- **Jefferson-Martin 230 kV Transmission Line.** Prepared air quality and noise studies for construction and operation of a 27-mile transmission line through urban and rural San Mateo County. The project is proposed to meet the projected electric demand in the Cities of Burlingame, Millbrae, San Bruno, South San Francisco, Brisbane, Colma, Daly City, and San Francisco.
- **Viejo System Transmission Project.** Prepared air quality, noise, and traffic analyses for construction of a controversial transmission improvement project in suburban south Orange County.
- **Looking Glass Networks Telecommunications Project.** Prepared the air quality and noise analyses for this Initial Study/Mitigated Negative Declaration (IS/MND) evaluating proposed fiber optic connections throughout the San Francisco Bay and Los Angeles areas, and developed programmatic mitigation measures for implementation of the metropolitan area network.

Presidio Trust, Presidio of San Francisco. Provided impact analysis for demolition, rehabilitation, and infill construction within the Public Health Service Hospital District, within the Golden Gate National Recreation Area and adjacent to sensitive San Francisco residences. Provided technical support and peer review of noise and vibration analyses related to the Doyle Drive Reconstruction through the Presidio of San Francisco. Involved protecting natural sounds consistent with National Park Service policy.

California State Lands Commission, Monterey Accelerated Research System Cabled Observatory. Providing technical analysis of air quality and noise effects of installing new underwater equipment in Monterey Bay. Supporting efforts of marine biologists with analysis of underwater noise.

California State Lands Commission, Concord-Sacramento Pipeline. Provided technical analysis of air quality and noise effects of constructing a new 20-inch, 70-mile petroleum products pipeline, including upgrades to storage tank facilities in Concord and distribution systems in West Sacramento.

California Department of Water Resources, Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project. Provided assessment of air quality and noise impacts for construction of upgrades.

Ventura County Resource Conservation District, Casitas Springs *Arundo Donax* Removal Demonstration Project. Prepared estimates of community noise impacts and air quality assessment for cutting and removing non-native plants for improving flood control along the Ventura River.

Technical Support for U.S. Army Corps of Engineers. Analyzed construction noise and air quality effects and described applicability of general conformity rule for various flood control improvements in Arizona and Southern California.

Technical Support for Los Angeles Unified School District. Provided technical analysis of air quality and noise effects for school expansion, play area expansion, and temporary classroom projects, including reviews of cumulative, regional air quality consequences of temporary projects.

EIP Associates 1998 to 2001

As a Senior Environmental Scientist at **EIP Associates**, Mr. Birdsall performed comprehensive analyses of air quality and noise impacts for Environmental Impact Reports/Statements and independent studies. His projects at EIP included:

- **Bay Area Rapid Transit District, Oakland Airport Connector EIS/EIR.** Prepared noise impact evaluation and mitigation strategies. Conducted community noise monitoring and assessment according to Federal Transit Administration methodology.
- **Presidio Trust Implementation Plan EIS and Letterman Complex Supplemental EIS.** Prepared community noise impact assessment and traffic noise mitigation strategies. Air quality management policy consistency analysis. The plan was awarded the 2003 Outstanding Land Use Plan from the Association of Environmental Professionals.
- **San Francisco International Airport, Offshore Runway Construction Concepts, AGS Design Team.** Conducted preliminary environmental review of design and construction concepts for runway expansion. Prepared emission control strategies for general conformity rule.
- **Sacramento Metropolitan Airport Master Plan EIS/EIR, Sacramento County Department of Environmental Review and Assessment.** Baseline emission inventory and regulatory constraints.
- **Desert Resorts Regional Airport, Thermal, Riverside County.** Emission inventory and general conformity determination for runway extension and taxiway improvements.
- **San Joaquin Area Flood Control Agency, Stockton Areawide Flood Control Projects.** Reviewed emission inventories and retroactive general conformity rule applicability for construction activities.
- **Alameda County Flood Control and Water Conservation District, Zone 7, Altamont Water Treatment Plant EIR.** Analyzed air quality and community noise effects of three potential water plant sites in remote eastern Alameda County.
- **Santa Clara Valley Water District, Coyote Watershed, Lower Silver Creek Project.** Analyzed air quality and community noise effects for Initial Study/Environmental Assessment of constructing flood control improvements and habitat restoration.
- **University of California, Davis.** Prepared campuswide health risk assessment update, which included toxic air contaminant emission inventory and dispersion modeling using ISC.

- **University of California, Berkeley.** Prepared initial air quality and noise technical studies for Long Range Development Plan Update EIR and analyses for Northeast Quadrant Science and Safety Project (Stanley Hall replacement building) EIR.
- **Merced County, Draft University Community Plan.** Prepared air quality and noise background studies and policy discussion papers for the new Merced Campus of the University of California.
- **Allegro Jack London Square Project, SNK Development.** Provided expert testimony on the pile driving noise impacts to residents in a revitalized, high-density City of Oakland neighborhood. Conducted field surveys with City Staff and evaluated compliance with City noise ordinance.
- **Maranatha High School and Playing Fields Project, City of Sierra Madre.** Prepared the community noise technical study for a new private high school with outdoor amphitheater and athletic facilities. Characterized noise from events to determine impact level on sensitive residential community.
- **State Route 275 Modification Project, City of West Sacramento.** Prepared noise technical studies on the realignment of the State Route 275 Modification Project. Required assessment of new traffic noise impacts caused by rerouting traffic to grade level in close proximity of existing sensitive land uses and identification of feasible measures to insulate lodging uses.
- **City of Mountain View, Whisman Road Transit Oriented Development MND.** Deputy Project Manager for Negative Declaration related to high-density office development at the Middlefield-Ellis-Whisman Superfund Site. Prepared various technical sections, managed traffic subconsultant, and coordinated preparing the environmental documents with the city staff.

Trinity Consultants 1994 to 1998

Mr. Birdsall prepared compliance strategies, evaluated modeled impacts, and negotiated air permits while a Project Supervisor at **Trinity Consultants**, an environmental firm specializing in air quality.

- **Browning-Ferris Gas Services.** Coordinated nationwide Title V program implementation, secured numerous new source and operating permits, supported rollout of federal new source performance standards for municipal solid waste landfills and landfill gas to energy facilities.
- **Newmont Mining Joint Venture, Batu Hijau Project.** Environmental impact studies for open-pit metallic mineral mining facility and independent power production facility. Included noise assessment for "greenfield" power plant and air quality impacts evaluation in complex, coastal terrain.
- **Questar Pipeline, TransColorado Pipeline Project.** Secured new source permits for air quality effects related to construction and operation of major natural gas pipeline including compressor stations.
- **Coastal Field Services, Altamont Gas Plant.** Negotiated Title V operating permits for upstream natural gas processing plant and associated field compressor stations.
- **Solvay Soda Ash Joint Venture.** Developed particulate matter modeling protocol with State agency.
- **Potlatch Corporation.** Facilitywide emission inventory and permitting for a wood products plant. Included regionwide analyses of ambient air quality standards and resolving existing modeled violations.

NOISE IMPACT ASSESSMENT MODELS

- Federal Highway Administration Traffic Noise Model
- California Department of Transportation Traffic Noise Model (SOUND32)
- FTA Transit Noise Assessment and Mitigation Methodology

AIR QUALITY MODELING EXPERTISE

MVEI/EMFAC; URBEMIS; CALINE4; SCREEN; ISC; CTDM; TANKS; Landfill Gas Emissions Model.

ADDITIONAL TRAINING AND COURSES

- Fundamentals of Noise and Vibration for the California Energy Commission
- Expert Witness Training, California Energy Commission
- Co-Instructor, Air Permitting Issues for Municipal Solid Waste Landfills, Trinity Consultants
- Fundamentals of New Source Review Workshop, Air and Waste Management Association
- Title V and Compliance Assurance Monitoring Workshops, Air and Waste Management Association
- NATO Advanced Studies Institute, Wind Climates in Cities

PROFESSIONAL AFFILIATIONS AND AWARDS

- Professional Engineer (Mechanical, California #32565)
- Qualified Environmental Professional, Institute of Professional Environmental Practice (#03030005)
- 2001 Outstanding Performance Award presented by the California Energy Commission
- Air and Waste Management Association since 1994

PUBLICATIONS

Smith, P.J., J.B. Birdsall, and P.E. Delamater. "A Discussion of Air Permitting Issues for Landfill Gas-To-Energy Projects." 88th Annual Meeting and Exhibition of the Air and Waste Management Association, San Antonio, Texas, 1995.

Meroney, R.N., D.E. Neff, and J.B. Birdsall. "Wind-Tunnel Simulation of Infiltration Across Permeable Building Envelopes: Energy and Air Pollution Exchange Rates." 7th International Symposium on Measurement and Modeling of Environmental Flows. International Mechanical Engineering Congress and Exposition, San Francisco, California, 1995.

Birdsall, J.B. and R.N. Meroney. "Model Scale and Numerical Evaluation of Tracer Gas Distribution Due to Wind-Forced Natural Ventilation." 9th International Conference on Wind Engineering, New Delhi, India, 1995.

Birdsall, J.B. Physical and Numerical Simulation of Wind-Forced Natural Ventilation, MS Thesis, Colorado State University, Fort Collins, Colorado, 1993.

DECLARATION OF MATTHEW S LAYTON

I, Matthew S. Layton, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as a Supervising 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 Greenhouse Gas Appendix of the Air Quality Staff Assessment for the Lodi Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/20/09 Signed: Original signature in Dockets

At: Sacramento, California

MATTHEW S. LAYTON

Experience Summary

Twenty five years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

Experience

1987-present – Senior Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Public Heath; and
- Transmission Line Safety and Nuisance.

Prepared Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

1983-1986 -- Control Systems Engineer, Bechtel Power Corporation. Managed a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment. Performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions. Initiated purchase orders for testing and formulated test objectives and test plans. Developed and implemented plant equipment maintenance and surveillance program based on test results, vendor recommendations and industry operating experiences. Trained client in environmental qualification engineering analysis and equipment maintenance program. Prepared client for NRC audits and presentation.

1981-1983 -- Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

DECLARATION OF
Joy Nishida

I**, Joy Nishida** declare as follows:

1. I am presently employed by the California Energy Commission in the **Biological Resources Unit** of the Siting, Transmission and Environmental Protection 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 **Biological Resources** for the Lodi Energy Center Power Plant project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 19, 2009 Signed: Original signature in Dockets

At: Sacramento, California

JOY NISHIDA
Biologist

Experience Summary

Twenty-six years experience in the biological field, including botanical consulting, curatorial management of vertebrate and herbarium collections, college-level instruction, and conducting biological resources impact analyses for inclusion in environmental documents.

Education

- California State Polytechnic University, Pomona—Master of Science, Biological Sciences
- California Polytechnic State University, San Luis Obispo—Bachelor of Science, Environmental & Systematic Biology and Natural Resources Management (Forestry Concentration)
- Certified Arborist — International Society of Arboriculture
  No. WE-8078A, expires 12/31/10

Professional Experience

July 2008 to Present—Planner II: Siting, Transmission & Environmental Protection Division – California Energy Commission, Sacramento

As a staff biologist, primary duties include conducting impact analyses to biological resources for power plant siting projects. Other duties include evaluating compliance with accepted Conditions of Certification related to biological resource technical areas for power plant facilities and coordinating with biological resource protection and management agencies, environmental organizations, universities, and special interest groups to assure their biological input into Commission programs.

January 2008 to July 2008—Environmental Scientist: Regional Programs Unit, Division of Financial Assistance – State Water Resources Control Board, Sacramento

Using scientific judgment, provided technical and administrative review of environmental documents for projects receiving financial assistance from the State Water Board. Reviewed and commented on environmental documents for wastewater treatment and water reclamation facilities, watershed protection, nonpoint source pollution control, and other local assistance projects to assure compliance with the California Environmental Quality Act and other Division's environmental review process. Participated in applicant meetings, prepared Agenda and Resolution language for various projects seeking local funding assistance from the State Water Board, developed environmental review summaries of projects to be funded, initiated consultation with federal authorities, developed mitigation measures, and resolved environmental concerns related to proposed projects. Coordinated interagency review of environmental documents subject to crosscutting federal regulations, and organized and maintained the Environmental Services filing system, library, and database.

April 2005 to January 2008—Botanist, Wetland Ecologist, and Certified Arborist - Jones & Stokes, Sacramento

Organized and conducted general plant surveys and directed plant surveys for special-status plant species, vegetation mapping, arborist surveys, and wetland delineations extensively throughout California. Wrote wetland delineation reports, arborist reports, and biological resource sections for the following environmental documents: Environmental Impact Reports, Environmental Impact Statements, Natural Environment Studies, Initial Studies, and Biological Analyses for listed species. Dealt with the legal requirements regarding the protection of biological resources and developed mitigation to prevent significant impacts. Coordinated the efforts of sub-consultants, clients, and coworkers in the development of environmental documents.

1990-2005—Botanical Consultant – Nishida Botanical Consulting

Worked as an independent contractor to consulting firms, educational facilities, and federal agencies. Duties included organizing and conducting floral inventories, directed searches for special-status plant species, vegetation mapping, monitoring revegetation sites, assisting in wetland delineations, and analyzing impacts on botanical resources.

1990-1996—Instructional Support Technician– California State University, Northridge

As a collections manager for the Department of Biology Herbarium and Vertebrate Collections, responsibilities included the acquisition, preparation, curation, and reorganization of the teaching and research collections. Implemented a database for the vertebrate collections. Recruited and supervised volunteers to assist in the collections. Also supervised graduate students. Other duties included instructional assistance with Botany and Vertebrate classes in the lab and in the field.

1987-1989—Biological Sciences Department Part-time Lecturer– California State Polytechnic University, Pomona

Taught and prepared majors and non-majors freshman level Biology labs.

DECLARATION OF
Beverly E. Bastian

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection 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,** for the Lodi Enegy Center project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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 23, 2009 Signed: Original signature in Dockets

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	A.B.D.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	A.B.D.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Energy Facilities Siting Division, Environmental Office, Biological and Cultural Unit,
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; developing mitigation measures to reduce to insignificant any impacts to significant cultural resources; providing expert testimony on my analyses and findings in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants, reviewing the CEQA documents of sister state agencies; consulting and advising cultural resources specialists in sister state agencies; coordinating and reviewing the work of Commission cultural resources consultants; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

Department of Social Sciences, American River College *2000 to 2002*
Instructor (part-time), American History
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate ability to organize information, to speak effectively to the public, and to train and direct other personnel.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority (personal services contract) *1979 to 1981, 1983-1984*
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log-cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects *1966 to 1981*

Professional Societies

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
National Council on Public History
Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I**, Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Hazardous Materials Management** and **Worker Safety/Fire Protection** sections for the **Lodi Energy Center Application** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 23, 2009__ Signed: Original signature in Dockets

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks,

management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Ballard Canyon Air Pathway Analysis and Human Health Risk Assessment, Santa Barbara County, Ca. (September 2000)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- San Francisco Energy Reliability Project, San Francisco, Ca. 2004-present. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR
- SFERP Project, San Francisco, Ca. 2004 – 2006. hazardous materials, worker safety/fire protection, waste management, public health

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Sites with RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA

methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF

I, **Rick tyler** declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission, and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I Supervised the preparation the staff testimony and errata on Public Health, Hazardous Materials Management, and Worker Safety Fire Protection Sections for the Lodi Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata 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 errata 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: 11/19/09 Signed: Original signature in Dockets

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

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
AMANDA STENNICK

I**, AMANDA STENNICK** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection of the Energy Facilities Siting and Environmental Protection Division as a Planner III.

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 **LAND USE** for the **LODI ENERGY CENTER,** based on my independent analysis of the Application for Certification, 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 23, 2009 Signed: Original signature in Dockets

At: Sacramento, California

AMANDA STENNICK - ENVIRONMENTAL PLANNER

Education
B.A., Urban and Economic Geography, University of California, Davis, 1986

Ms. Stennick is an environmental planner with more than 22 years experience in land use, socioeconomic, and public policy analysis for power plants and energy infrastructure, and industrial and residential development projects in California. Ms. Stennick has extensive professional planning experience in both the public and private sectors; her expertise includes NEPA and CEQA document preparation, land use analysis and regulatory requirements for Williamson Act cancellations, assessment of land use alternatives, socioeconomic and public policy analysis, and environmental justice analysis. A partial list of projects where she has written assessments or managed the preparation of environmental documents is provided below.

Land Use Assessment for Energy Projects

Ivanpah Solar Project (FSA/EIS)
Blythe Transmission Line (FSA/EIS)
Analysis of service district boundaries (LAFCO/San Diego County) Orange Grove Energy Project
Land use and Williamson Act analysis for Panoche Energy Center, Starwood Power Project, Pastoria Energy Facility, Hydrogen Energy California
Land use and California Coastal Act consistency analysis for Humboldt Bay Repowering City of Pittsburg Trans Bay Cable Project
LNG facility, Port of Long Beach, CA.

Environmental Justice Analysis

2001, 2003, and 2005 Environmental Performance Report for CEC
San Francisco Energy Cogeneration Project, Morro Bay Power Plant Project, El Segundo Power Redevelopment Project

Infrastructure Projects

Project Manager for EIR/EA for the Mammoth County Water District. Analyzed impacts resulting from lake water transfers and maintenance of in-stream flows in the Mammoth Lakes Basin; prepared land use, socioeconomics, recreation, and public services and utilities sections of EIR/EA.

Project Manager for Effluent Treatment Plant EIR for Simpson Paper Company (Humboldt County). Prepared land use, socioeconomics, recreation, public services and utilities, cumulative impacts sections, and mitigation monitoring.

Project Manager for Folsom/SAFCA Reoperation. Determined parameters of project description with respect to water modeling, project geographic boundaries, and agency jurisdictional boundaries; ensured compliance with federal, state, and local plans and policies.

Project Manager. Yolo County Powerline Ordinance. Developed land use policies and mitigation measures for placement of powerlines and substations in Yolo County.

Project Manager and principal author for Energy Component of the Public Services and Facilities Element of the Sacramento County General Plan.

Redevelopment and Residential Projects

Project Manager: EIR for a Planned Development, General Plan Amendment, and rezone request for a 504-acre Business and Industrial Park expansion for the Port of Sacramento. Prepared work scope and budget for Public Improvements Plan and Specific Plan for an 80-acre Mixed Use/Water Related development, including a Mitigation Monitoring Plan and Statement of Overriding Considerations for the City of West Sacramento. With CDFG, developed regional approach to mitigation for project-impacted endangered species.

Project Manager : EIR for the Wildhorse Residential/Recreational Planned Development, (Davis, CA). Prepared land use, project alternatives, cumulative impacts sections; determined project alternatives based on traffic models and allowable housing densities.

Professional and Continuing Education

California Environmental Quality Act (UC Davis, 1988)
Subdivision Map Act (UC Davis, 1989)
Fiscal Impact Analysis (UC Davis, 1991)
APA Conference (San Francisco, 1994)
Environmental Justice Conference (UC Berkeley, 1994)
California Environmental Quality Act (California Energy Commission, 1998)
Roundtable on Environmental Justice US/Mexico Border 1999
Local Agency Formation Commission - LAFCO (UC Davis, 2000) 2000
Geographic Information System – GIS (UC Davis, 2005)
Mapping Your Community: GIS and Community Analysis (Sacramento, CA, 2006)
Conservation Strategies, Easements, and the Williamson Act (Valley Springs, CA, 2008)
Tribal Energy in California; Law Seminars International (Cabazon, CA, 2009)

DECLARATION OF
Erin Bright

I**, Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting Transmission 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 prepared the staff testimony on **Noise and Vibration** for the **Lodi Energy Center Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 19, 2009 Signed: Original signature in Dockets

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, Transmission, and Environmental Protection Division as a Staff Toxicologist.

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 Line safety and Nuisance** for the Lodi Energy Center Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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: 11/20/09 Signed: Original signature in Dockets

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
Testimony of Scott Debauche

I**, Scott Debauche,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission, & Environmental Protection Division, as a **Socioeconomics Specialist**.

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 **Lodi 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 23, 2009 Signed: Original signature in Dockets

At: Agoura Hills, California

SCOTT DEBAUCHE

Environmental Planner

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1994

PROFESSIONAL EXPERIENCE

Mr. Debauche is an environmental planner with 14 years of experience preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Mr. Debauche brings the experience of specializing in the integration and completion of NEPA and CEQA documentation joint documentation. Mr. Debauche specializes in evaluating Transportation/Traffic, Noise, Socioeconomics and Environmental Justice, Air Quality, Alternatives analysis, and public and community involvement programs.

Aspen Environmental Group — 2001 to present

- **TANC Transmission Project (TTP) EIR/EIS, several Northern California Counties.** Mr. Debauche is currently serving as the Technical Specialist in charge of preparation of the EIR/EIS Transportation/Traffic and Socioeconomics CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Air Quality for this EIR. The applicant, Alta Windpower Development, LLC, proposes to develop the Alta-Oak Creek Mojave Project (proposed project or project) for the commercial production of up to 800 Megawatts (MW) of electricity from wind turbines. The proposed project would result in construction of up to 350 wind turbine generators, their ancillary facilities and supporting infrastructure located on three distinct land areas comprising a total of approximately 10,750 acres located approximately 3 miles west of State Route (SR) 14 (Antelope Valley Freeway) and 3 miles south of SR-58 in the Willow Springs area of eastern Kern County.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Socioeconomics for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal conformity requirements. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **Baldwin Hills Oil Field Community Standards District EIR Review and Ordinance Preparation, Culver City, CA.** Mr. Debauche served as the Technical Specialist for the City of Culver City reviewing the Los Angeles County Baldwin Hills Oils Field Community Standards District EIR Noise analysis evaluating the impacts of expanding the existing Baldwin Hills oil field. Once completed, Mr. Debauche then prepared the Noise section of the newly enacted City of Culver City Community Standards District overlay zone restricting noise generation by the Baldwin Hills Oil Field on the residents of Culver City.
- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore Liquified Natural Gas facility to be located at the Port of Long Beach. Mr. Debauche reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Transportation/Traffic and Noise.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR. The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City.

California Public Utilities Commission (CPUC). Under Aspen's environmental services contract with the CPUC, Mr. Debauche has prepared environmental analysis sections of environmental reports analyzing large-scale infrastructure projects. His project experience with the CPUC includes the following:

- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche is currently serving as the Technical Specialist for Noise and Alternatives evaluation for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described below.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **MARS EIR/EIS, Monterey, CA.** Mr. Debauche served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the

installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.

- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.
- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist for Socioeconomics and Alternatives evaluation of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County.
- **SDG&E Miguel Mission Substation Draft EIR.** The major part of the Proposed Project would include the installation of a new, bundled 230 kV circuit between Miguel and Mission Substations, which would be located entirely within SDG&E's existing 35-mile ROW. Mr. Debauche prepared social science analysis for the Initial Study, as well as the Draft EIR Project Description and several key environmental sections.
- **PG&E's Proposed Divestiture of Hydroelectric Assets Project EIR.** Mr. Debauche prepared several key sections of the Draft EIR, including Socioeconomics and Hazardous Materials analysis.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19

double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompasses and evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Prepared the socioeconomic analysis for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties.

California Energy Commission (CEC), Technical Assistance in Application for Certification Review. In response to California's power shortage, Aspen is assisting the California Energy Commission in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Debauche works as a technical specialist for Transportation/Traffic, Socioeconomics and Environmental Justice, and Alternatives analyses for the following power plant projects:

- **Carlsbad Energy Center Project, Carlsbad, CA.** Technical Specialist for both the Transportation/Traffic and Alternatives Staff Assessment for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.
- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing TPP, a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity.
- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing Henrietta Power Plant. New once-through steam generators (OTSGs) will be installed to allow the plant to be operated in its current simple-cycle configuration with no steam generation but with the selective catalytic reduction (SCR) and oxidation catalyst in operation, or to operate as a combined-cycle power plant generating an additional 25 MW of power with new proposed emission limits.
- **CPV Vaca Station Power Plant, Solano County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for CPV Vacaville, LLC (CPVV) filed an Application for Certification (08-AFC-11) seeking authority to construct and operate the CPV Vaca Station (CPVV) project, a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 660 megawatts (MW). The CPVV is proposed for a 24-acre site located at the intersection of Lewis and Fry roads in a rural area within the city limits of Vacaville, Solano County.
- **Kings River Conservation District Community Peaker Power Plant, Fresno County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for the Kings Rivers Conservation District, who filed a Small Power Plant Exemption for the King River Conservation District Peaking Power Plant. The proposed 97-megawatt natural gas-fired plant will be located south of the City of Fresno and near the community of Malaga in Fresno County.
- **Lodi Energy Center, Lodi, CA.** Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility.
- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California.

- **Canyon Power Plant, Anaheim, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **Valero Cogeneration Project, Benicia, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
- **Rio Linda/Elverta Power Project, Sacramento, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
- **Magnolia Power Project, Burbank, CA.** Technical Specialist for the Socioeconomics Staff Assessments for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated.
- **Avenal Energy Project, Kings County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Inland Empire Energy Center, Riverside County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. The project would be located on approximately 46-acres near Romoland, within Riverside County.
- **Coastal Plant Study.** Technical Specialist for the Socioeconomics Staff Assessments for a possible modernization, re-tooling, or expansion of California's 25 coastal power plants including the Encina Power Plant and the San Onofre Nuclear Power Plant.

Los Angeles Department of Water and Power (LADWP). Responsible for conducting the analyses of the technical and social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project IS/MND, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **Taylor Yard Water Recycling Project (TYWRP) IS/MND, Los Angeles and Glendale, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more

than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.

- **DC Electrode Project IS/MND, Los Angeles, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a new electrode distribution line from West Los Angeles to the Pacific Ocean stopping point in Malibu, CA up the Pacific Coast Highway.
- **District Cooling Plant Project, Los Angeles IS/MND, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a District Cooling Plant and Distribution System (proposed project) in order to provide a centralized system for producing chilled water for use by area users, which are generally large commercial, governmental, industrial and institutional buildings who generate their own chilled water utilizing individual chiller plants for space cooling and air-conditioning.

U.S. Army Corps of Engineers, Los Angeles District. Responsible for conducting the analyses of the social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Worked with preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
- **Murrieta Creek Flood Control and Environmental Restoration Project**. Mr. Debauche served as a technical writer of an Environmental Assessment and Mitigation Monitoring plan for Phase 1 of a flood control and restoration project in Riverside County.

California Department of Water Resources. Responsible for conducting the environmental analyses for CEQA compliance as part of two environmental services contracts. Delivery orders have included:

- **Piru Creek Stabilization and Restoration Project.** The California Department of Water Resources (CDWR) proposes to repair erosion damage at a series of three locations downstream of Pyramid Dam and seismically retrofit the Pyramid Dam access bridge that crosses Piru Creek. Mr Debauche served as technical writer of the Initial Study for this project.

Los Angeles Unified School District (LAUSD), Los Angeles County, CA. Deputy Program manager and Technical writer for several CEQA documents (EIRs and IS/MNDs) being prepared as part of Aspen's ongoing services contract with the LAUSD to help approve school projects that would meet existing overcrowded conditions in the greater Los Angeles area. Projects have included:

- **New School Construction Program EIR.** Serves as a technical writer for social science issues, including socioeconomics, and population and housing for this Program EIR being prepared for the LAUSD. The LAUSD 2020 Program would provide student seats throughout the LAUSD via a combination of the addition of portable classrooms to existing campuses, modernization and reconfiguration of existing campuses, and the construction of new schools. Mr. Debauche prepared the Noise, Socioeconomic, and Alternative Evaluation of this EIR.
- **East Valley Middle School No. 2 EIR.** Served as a key technical writer for this middle school project proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
- **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** Served as Deputy Program Manager for this project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed

project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, was impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **Canoga Park New Elementary School IS/MND.** Served as technical writer for this elementary school project proposed to be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "turn-key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
- **Hughes Magnet Span School IS/MND.** Served as a technical writer for socioeconomics, hydrology, public services and utilities, and recreational impacts for the proposed re-opening of the existing Hughes Middle School as a Magnet Span School serving up to 1,620 District 6th though 12th grade students. The re-opening of the Hughes Middle School would require the relocation of the existing uses of the campus. The existing Enadia Way Elementary School and Platt Ranch Elementary School would be re-opened for the relocation of these uses.
- **Wonderland Elementary School Portable Classroom Additions IS/MND.** Served as the technical writer of an IS/MND for a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles. Ms. Walker is responsible for overall coordination and scheduling of the project's environmental review, communications with the LAUSD, senior technical review of all documents produced, presentation during the project's public scoping meetings and hearings, and assurance of public noticing. Served as technical writer of the IS/MND.
- **Pio Pico Elementary School Playground Expansion IS/MND**. Completed a Notice of Preparation, Initial Study, and Administrative Draft EIR for the expansion of a playground at the existing Pio Pico School in the LAUSD. The playground was proposed on five residential properties. One of the residences is a potentially significant historical resource because of its association with an African-American woman journalist, Fay M. Jackson. This project was cancelled by the LAUSD after completion of the administrative draft report. Served as technical writer of the IS/MND.
- **Fairfax Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Polytechnic Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Washington Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.

EIP Associates 1998 to 2001

MTA Mid Cities/Westside Transit Corridor Study EIS/EIR. Was a key writer of the EIS/EIR for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to preparing several issue area chapters of this comprehensive joint EIS/EIR, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.

Wes Thompson Ranch Development Project EIR. Served as project writer for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other

issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

City of Santa Monica Environmental Assessments. Was key writer of several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the projsect's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main St. Mixed-Use Development Project EIR**. This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

Specific Plans and Redevelopment Projects. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
- **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
- **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generate population inducement.
- **Triangle Gateway Redevelopment Project EIR in Beverly Hills, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the triangle gateway portion of

downtown Beverly Hills. Issues of concern evaluated by Mr. Debauche included traffic, land use, and impacts to on-site historic structures.

- **UCLA Campus Housing Expansion.** This EIR evaluated the development and expansion of campus housing within the UCLA campus. Issues of concern evaluated by Mr. Debauche included hazardous materials and population/housing.

CH2M Hill - Minneapolis, MN 1995 to 1998

- **Minneapolis/St. Paul International Airport Expansion EIS:** Mr. Debauche was a key writer of the EIS for this $4 million technical and environmental study, including the preparation of an Environmental Impact Statement (EIS), and an evaluation of the urban design implications of a proposed $800 million expansion of the existing MSP International airport, including transit and terminal modifications and the inclusion of a new perpendicular runaway. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. In addition to preparing several issue area chapters of this comprehensive EIS, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the socioeconomics sections of the EIS. In addition, Mr. Debauche assisted with preparation of a technical report on airport noise effects on nearby housing and mitigation programs for the impacts of the proposed runway.
- **Minneapolis/St. Paul Wastewater Treatment Facility Expansion EIS:** Was a key writer of the EIS for expansion of the existing wastewater treatment facility serving the twin cities area. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. Mr. Debauche prepared several issue area chapters of this comprehensive EIS, including the Environmental Justice Analysis (per Executive Order 12898), and the socioeconomics sections of the EIS.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Chapter Member

DECLARATION OF

I, **Paul Marshall**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission, and Environmental Protection Division as a Senior Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Soil and Water Resources**, for the Lodi Energy Center project based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/20/09 Signed: Original signature in Dockets

At: Sacramento, California

Paul D. Marshall

EDUCATION

SAN DIEGO STATE UNIVERSITY, CALIFORNIA
Bachelor of Science Degree in Engineering Geology
Completed post-baccalaureate courses in Engineering Geology

FRESNO STATE UNIVERSITY, CALIFORNIA
Completed post-baccalaureate courses in Civil Engineering

LICENSES

California Registered Geologist, No. 5718
California Certified Engineering Geologist, No. 1817
California Certified Hydrogeologist, No. 468

EMPLOYMENT HISTORY

CALIFORNIA ENERGY COMMISSION
Siting, Transmission, and Environmental Protection Division – Supervisor, Soil, Water Resources, and Waste Management Unit/ January 2008 -Present
Supervise a multidisciplinary team of engineers and geologists responsible for analysis of potential environmental impacts from power plant construction and operation to soil and water resources and from waste management activities. Provide guidance and technical assistance to staff for complex analysis of power plant impacts on water supply, water quality, wastewater disposal, discharges to surface water and groundwater, development and utilization of groundwater, flood impacts and storm water management, and assessment of potential impacts on human health and the environment. Ensures staff work products are consistent with laws, regulations, and policies of the US EPA, US ACOE, SWRCB, RWQCB's, CDFG, DTSC, and other local ordinances. Contract with and direct the work of consultants conducting technical reviews of power plants. Schedule and confer with a multidisciplinary staff of planners, engineers, and scientists to ensure staff analyses are coordinated with other disciplines where there is overlap. Ensure product delivery in a timely manner. Hire and develop staff, complete probationary and performance reports, counsel and mentor staff. Take adverse actions when appropriate.

CALIFORNIA DEPARTMENT OF CONSERVATION
Office of Mine Reclamation – Supervisor, Compliance Unit/October 2006 – January 2008
Supervise a team of engineering geologists responsible for ensuring compliance with mine reclamation plans and specifications. Review and approve staff work conducted to ensure plans and specifications were adequate and enforceable. Direct staff responsible for enforcement actions and preparation of data and reports for presentation to the State Mining and Geology Board. Oversight of staff review of cost estimates for mine reclamation and conduct statewide workshops outlining requirements for mine reclamation cost estimates. Implement Lead Agency review and audit program.

STATE WATER RESOURCES CONTROL BOARD
Division of Financial Assistance – Chief, Project Implementation Unit/January 2001 – September 2006
Supervise a multidisciplinary team responsible for contract and project management associated with Prop 13, Prop 40, Prop 50, Water Bond 1986 and 1996, and the Federal Clean Water Act funding programs. Develop program policies and procedures for implementation and management of grant and loan programs and projects. Direct the work of staff and coordinate with state and federal agencies in the development of technical review criteria for selection of projects recommended for grant award. Direct the work of staff and contractors developing a Project Assessment and Evaluation Program used to evaluate program effectiveness. Provide guidance and technical support to stakeholders for project development. Represent SWRCB at public meetings and conduct training on program procedures. Ensure project integrity and compliance with State and Federal laws.

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Division of Local Assistance - Senior Engineering Geologist/ July 2000 – January 2001

Manage multidisciplinary staff to identify and develop conjunctive water management programs throughout Southern California. Organize, guide, and support local stakeholder groups in development of conjunctive water management plans. Develop partnering opportunities with other local, state, and federal agencies to spread program benefits region-wide and implement CALFED goals and objectives. Write and review contract documents, task orders, grant applications, and provide input on program policy. Solicit and assist agencies with loan and grant applications for various Water Bond 2000 programs.

Division of Safety of Dams - Senior Engineering Geologist/October 1995 – June 2000

Serve as an engineering geology consultant to a staff of 47 design and field engineers performing regulatory oversight of dam construction and operation. Evaluate existing and proposed dam sites for geologic and seismic hazards; review and comment on geotechnical site assessments and construction plans and specifications; act as technical adviser to staff during construction; inspect and document geologic conditions. Communicate findings to staff, consultants, and owners through written reports, briefings, and meetings. Give presentations to DSOD Board of Consultants on development of state-of-the-art procedures. Develop information and monitor changes in the regional geologic environment.

Division of Local Assistance - Associate Engineering Geologist/November 1993 - October 1995

As a member of the Water Quality Assessment Program I independently performed surface and groundwater studies, and environmental site assessments for both DWR and federal and local government agencies. Negotiated contracts, authored task assignments, and oversaw the work of consultants. Authored reports with analysis of data from various types of exploration and sampling programs. Assembled a Department-wide Site Assessment Project Team and assisted in developing DWR policy for site assessments. Trained team members and gave staff presentations outlining program and team goals.

Division of Local Assistance - Associate Engineering Geologist/October 1992 - October 1993

Under the auspices of the Proposition 82 Water Conservation Bond Law of 1988, I directed the Department's technical, environmental, and economic review of ground water recharge and water supply loan applications. Performed independent technical review and certified feasibility and construction loan applications. Provided assistance to public water agencies regarding compliance with environmental and water rights regulations, and institutional and legal requirements for project development. Coordinated Department's technical review and comment on various CEQA documents.

KLEINFELDER, INC.

Project Geologist - 4 years

Worked in regional offices throughout Central and Southern California, Western Arizona and Southern Nevada performing geotechnical investigations and environmental site characterizations. Supervised field exploration activities throughout the Central Valley and Central Coast of California. Directed water resource, groundwater recharge, geotechnical, and environmental site characterization studies. Marketed clients, determined scope of services, and prepared cost proposals. Monitored project schedules and billing. Briefed clients and supervisors on project status. Authored reports providing geotechnical recommendations for various federal, state, municipal, and commercial projects. Inspected remediation and stabilization projects. Other responsibilities included compilation of data using spreadsheets and databases, conducting literature and aerial photograph review, and writing reports.

EARTH SYSTEMS, INC.

Staff Geologist - 3 years

Designed and supervised installation of monitoring well arrays, extraction wells, drains, dewatering, and slope monitoring equipment throughout central and southern California. Directed subsurface exploration using various drilling and geophysical techniques. Conducted liquefaction, fault rupture hazard, and coastal bluff stability studies. Conducted special inspections of excavations, deep foundations, reinforced earth, and concrete. Performed numerical analyses for slope stability, liquefaction, and earthquake ground motion studies. Authored reports containing cross-sections, maps, and graphs presenting various types of water resource and geotechnical data.

DECLARATION OF
DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner III**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Traffic and Transportation for the Lodi Energy Center Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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 19, 2009 Signed: Original signature in Dockets

At: Sacramento, California

DAVID FLORES

WORK EXPERIENCE

Sept. 1998 to Present — **Planner 2.** 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; participate in public workshops; present sworn testimony during evidentiary hearings, 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)

Responsibilities included the following:

- Administered 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.

June 1, 1976 to March 25, 1988 — **Manager of Resources** Citizens Utilities Company of California

Responsibilities included the following:

- Coordinated, planned and developed semi-annual and annual construction and operating and maintenance budgets for all Northern California operations.
- Assisted in the development of rate and fee schedules before the California Public Utilities Commission for all Northern California Operations.
- Direct five employees and twenty-five employees in the outlying operations.
- Extensive experience in specification writing, project planning and scheduling, construction management, and site supervision

EDUCATION

California State University @ Sacramento
University of California @Davis
Major: Environmental Studies
Minor: Business Administration

DECLARATION OF MARIE MCLEAN

I, Marie McLean, declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on visual resources for the Lodi Energy Center project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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 19, 2009 Signed: Original signature in Dockets

At: Sacramento, California

MARIE McLEAN

QUALIFICATIONS SUMMARY

Twenty years experience in the field of environmental research, analysis, and planning, with specific emphasis on the economics of water, energy, and land use and its social, visual, and cultural ramifications. Specific projects involved (1) assessing economic costs and benefits of water delivery contracts and energy sales; (2) conducting and presenting visual analyses of historic and other local, state, and federal resources; (3) preparing local, state, and federal resource assessment forms; (4) determining and communicating benefits and costs of proposed development projects (housing, energy, and water) on the social and economic life of communities in which they are located; and (5) as member of local design review, historic preservation, and housing boards, recommended programs and policies and monitored their implementation.

RECENT PROFESSIONAL EXPERIENCE

California Energy Commission, Planner II, Environmental Office-Facilities Siting, January 2008—present.

Conduct technical analyses for complex facility siting cases and planning studies in the area of socioeconomics and visual resources.

Electricity Oversight Board; June 1, 2007—December 31, 2008.

Developed, conducted, and presented economic studies on energy markets and transmission projects; California Independent System Operator (CAISO) market redesign and technology upgrade program; and investigated, analyzed, and reported the effects of existing and proposed energy programs on supply, demand, and rates.

California Department of Water Resources, State Water Project Analysis Office, June 2001—July 31, 2007.

Developed and implemented complex analyses of the social, economic, and financial ramifications of contracted and proposed water deliveries and transfers and changes to valuation methods for selling energy in deregulated markets. Researched, identified, and reported on market activities in energy and water and their economic effects on ratepayers.

EDUCATION

Bachelor of Arts, Economics, California State University, Sacramento, 1983

DECLARATION OF
Testimony of William Walters, P.E.

I**, William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission Siting, Transmission, and Environmental Protection Division, as a senior associate in engineering and physical sciences.

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 **Visual Resources (Visible Plume Modeling Analysis)**, for the **Lodi Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 20, 2009 Signed: Original signature in Dockets

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspection, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

Aspen Environmental Group — 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center (in progress); Starwood Power Plant (in progress); Bullard Energy Center (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant (in progress); South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant (in progress); Colusa Generating Station; and Russell City Energy Center (in progress).
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (in progress); Eastshore Energy Power Plant; and the Blythe Energy Power Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant.

- Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.
- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; and Salton Sea Unit 6 Project.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Completion of an audit of power plant cost factors for integration into the Energy Commission Cost of Generation Model.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.
- For the **Department of Water Resources (DWR)**:
  - Preparation of the Air Quality sections for two separate DWR Santa Ana Valley Pipeline Repairs Project CEQA Categorical Exemption Memorandums.
  - Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.
- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- For **Los Angeles Unified School District (LAUSD)**:
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.
  - Management and preparation of the Draft Air Quality Sections for the Reseda Senior High School Portable Addition IS/MND and Wonderland Elementary Addition IS/MND projects for LAUSD.
- Other Projects:
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.

- Preparation of the Air Quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC).
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

Camp Dresser & McKee, Inc. 1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research 1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions 1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc. **1990 to 1995 and 1996 to 1997**

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group **1988 to 1990**

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Ellen Townsend-Hough

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Siting Transmission& Environmental Protection 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 Waste Management for the NCPA Lodi Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/19/09 Signed: Original signature in Dockets

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.

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 Siting, Transmission, 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 participated in the preparation of the staff testimony on **FACILITY DESIGN** for the **Lodi Energy Center** project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 23, 2009 Signed: Original signature in Dockets

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
Patrick A. Pilling, Ph.D., P.E., G.E., D.GE.

I, **Patrick A. Pilling**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Geotechnical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Geology and Paleontology**, for the **Northern California Power Agency (NCPA) Lodi Energy Center (LEC)** project based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 20, 2009 Signed: Original signature in Dockets

At: Reno, Nevada

PATRICK A. PILLING, Ph.D., P.E., G.E.

Executive Vice President
Principal Geotechnical Engineer

Education

$ B.S. B Civil Engineering B1986 B Santa Clara University
$ M.S. B Civil Engineering B 1991 B San Jose State University
$ Ph.D. B Civil Engineering B 1997 B University of Nevada, Reno

Registrations

- P.E. - Civil - Nevada – No. 9153
- P.E. - Civil – California – No. C 49578
- P.E. - Geotechnical – California – No. GE 2292
- P.E. - Civil - Oregon – No. 19675PE
- P.E. – Geotechnical – Oregon – No. 19675PE
- P.E. - Civil – Arizona – No. 35310
- P.E. - Civil – Utah – No. 971338-2202

Associated Experience

- University of Nevada, Reno - Course Instructor - CE 771 - Mining Waste Containment Design
- University of Nevada, Reno - Course Instructor - CE 771 - Practical Foundation Engineering

Experience

1997 to Present: Black Eagle Consulting, Inc.; Executive Vice President. Dr. Pilling maintains over 18 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. As Executive Vice President, Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinates company marketing efforts, and performs project management, engineering and laboratory analyses, and report preparation on most projects. Dr. Pilling presently serves as our project manager of the Reno Retrack construction management team reviewing geotechnical design submittals for this rail project.

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects. Responsibilities included design and

construction of drilled shafts, earth retention, and underpinning systems, in addition to construction scheduling and cost control.

Affiliations

- American Public Works Association
- American Concrete Institute: Concrete Field Testing Technician Grade I
- National Society of Professional Engineers
- Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- American Society of Civil Engineers
- International Association of Foundation Drilling
- National Council of Examiners for Engineering and Surveying
- American Society of Engineering Education
- Deep Foundations Institute

Publications

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, June 1996, ADevelopment of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects,@ Report No. CCEER-94-4, University of Nevada, Reno; Federal Study No. F94TL16C, Submitted to State of California Department of Transportation (CalTrans).

Ashour, M., P. A. Pilling, and G. M. Norris, March 1997, ADocumentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups,@ Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, pp. 344-359.

Ashour, M., P. Pilling, and G. Norris, 1998, "Updated Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Piles and Pile Groups," Proceedings, 33rd Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Reno, pp. 177-178.

Ashour, M., G. Norris, and P. Pilling, April 1998, ALateral Loading of a Pile in Layered Soil Using the Strain Wedge Model,@ Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, pp. 303-315.

Ashour, M., G. M. Norris, S. Bowman, H. Beeston, P. Pilling, and A. Shamsabadi, March 2001, "Modeling Pile Lateral Response in Weathered Rock," Proceeding 36th Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Las Vegas, 2001.

Ashour, M., G. Norris, and P. Pilling, July/August 2002, "Strain Wedge Model Capability of Analyzing the Behavior of Laterally Loaded Isolated Piles, Drilled Shafts, and Pile Groups," Journal of Bridge Engineering, ASCE, Vol. 7, No 4, pp. 245-354.

Ashour, M., P. Pilling, and G. M. Norris, March 26 – 31, 2001, "Assessment of Pile Group Response Under Lateral Load," Proceedings, 4th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, University of Missouri – Rolla, MO, Paper 6.11.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, March 1995, AThe Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis,@ Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, pp. 40-53.

Norris, G. M., P. K. Gowda, and P. A. Pilling, February 1993, AStrain Wedge Model Formulation for Piles,@ Report No. CIS 91-11, University of Nevada, Reno.

Pilling, P. A., 1997, AThe Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model,@ Doctoral Dissertation, University of Nevada, Reno.

Pilling, P. A. and P. V. Woodward, March 1995, ADependent Facility Closure in California,@ Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, pp. 315-326.

Pilling, P.A. and H. E. Beeston, March 1998, AExpansion Testing of Clay Soils in Forensic Investigations,@ Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, 2001, "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, Paper No. 01-0174, pp. 115-121.

Pilling, P.A., July 2002, "Assessing the Liquefaction Potential of Sand Deposits Containing an Appreciable Amount of Gravel," Program with Abstracts 2002 Annual Meeting Association of Engineering Geologists and American Institute of Professional Geologists, Reno, Nevada, p35.

Awards

- Hugh B. Williams Industry Advancement Scholarship, International Association of Foundation Drilling (ADSC), 1993-94.

- National Society of Professional Engineers, Northern Nevada Chapter, Young Engineer of the Year, 1996.

DECLARATION OF
Steve Baker

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency** and **Power Plant Reliability**, and supervised preparation of the staff testimony on **Noise and Vibration, Facility Design** and **Geology and Paleontology**, for the Lodi Energy Center Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/19/2009 Signed: Original signature in Dockets

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-four 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 6/30/2010

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

DECLARATION OF
LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission & Environmental Protection Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Transmission System Engineering, for the Lodi Energy Center based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/20/09 Signed: Original signature in Dockets

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).

- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.

- Perform load flow studies and fault analysis.

- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.

- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.

- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.

- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

DECLARATION OF
Mark Hesters

I**, Mark Hesters** declare as follows:

1. I am presently employed by the California Energy Commission in the **Strategic Transmission Planning Office** of the Siting, Transmission and Environmental Protection 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 **Lodi Energy Center** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/23/2009 Signed: Original signature in Dockets

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has sixteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION OF
ANGELIQUE JUAREZ-GARCIA

I, Angelique Juarez-Garcia, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission 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 Compliance General Conditions and Closure Plan section for the Lodi Energy Center Power Plant Project Final Staff Assessment 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(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: 11/19/9 Signed: Original signature in Dockets

At: Sacramento, California

ANGELIQUE JUAREZ-GARCIA

Planner I

RELATED EXPERIENCE SUMMARY

Angelique Juarez-Garcia has nine years of experience in utilities project management. She has worked in telephone outside plant engineering and construction from 1999 to 2008 overseeing engineering, GIS, forecasting, and joint utility projects. Angelique now works in the Energy Commission's Compliance Unit of the Siting, Transmission & Environmental Protection Division.

EXPERIENCE

July 2008 -Present Compliance Project Manager – California Energy Commission
Siting, Transmission & Environmental Protection Division

California Energy Commission, Planner I
Direct technical staff in tasks related to power plant project design, construction, operation, and associated environmental issues. Negotiate agreements between power plant operators, public agencies, and community groups. Consult with engineering, legal and technical staff to identify and resolve technical issues. Current construction and operational projects include: Los Esteros 2 Power Plant, Morro Bay Modernization & Replacement Power Plant Project, San Francisco Electric Reliability Project, Delta Energy Center, Los Medanos Energy Center, NCPA 2& 3, Tracy Peaker, and SMUD Cosumnes.

January 2004 -July 2008 OSP Engineer
AT&T via contracting firms NorthStar, Byers Engineer, Randstad and TNMG

Partnered with electrical utility companies for joint facility siting. Cost estimated utility projects for 3rd party contractor on behalf of SBC. Trained team of on and off site engineers to meet SBC standards. Planned and forecasted utility growth to new and existing neighborhoods. Collaborated with government agencies to obtain Right of Way and encroachment permits. Coordinated with clients to develop project guidelines that meet CPUC tariffs.

November 1999 -December 2003 Single Point of Contact and Outside Plant Engineer
SBC/AT&T, 1999-2003

Engineered and cost estimated utility projects for my designated wire centers. Coordinated the path of utilities with electric companies and other utilities. Analyzed demand and consumption trends to develop strategic and cost efficient construction plans. Partnered with customers to obtain property right-of-ways. Coordinated with Federal, State, County and City officials to obtain building, street crossing and encroachment permits. Evaluated construction overages & created a program for better cost forecasting.

Education: Master of Science Degree, 2002
Management of Technology, Golden Gate University

Bachelor of Arts Degree, 1997
Economics, UC Santa Cruz

Certificate of Paralegal Studies, 1991
Barclay College

Related Training: Graduate Level Project Management Course at Golden Gate University
AT&T's Eight Week Outside Plant Training Course
Environmental Business Upper Division Course at UC Santa Cruz
Basic CEQA 3 Day Workshop

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *Lodi Energy Center*

DOCKET NO. 08-AFC-10

PROOF OF SERVICE
(Revised 2/17/09)

APPLICANT

Ken Speer
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Northern California
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Roseville, CA 95678
ken.speer@ncpagen.com

Ed Warner
Project Manager
Northern California
Power Agency
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sgalati@gb-llp.com

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APPLICANT'S ENGINEER

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Project Manager
Worley Parsons
2330 E. Bidwell, Ste. 150
Folsom, CA 95630
Steven.Blue@WorleyParsons.com

INTERESTED AGENCIES

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e-recipient@caiso.com

INTERVENORS

ENERGY COMMISSION

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Chairman and Presiding
Member
kldougla@energy.state.ca.us

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Elena Miller
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DECLARATION OF SERVICE

I, April Albright, declare that on November 30, 2009, I served and filed copies of the attached Lodi Energy Center Staff Assessment, dated October 2009. The original documents, filed with the Docket Unit, are accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[www.energy.ca.gov/sitingcases/lodi]**. The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

__✓__ sent electronically to all email addresses on the Proof of Service list;

__✓__ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

__✓__ **sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);**

OR

____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original signed by
April Albright