Preliminary Staff Assessment

COLUSA GENERATING STATION

Application For Certification (06-AFC-9)
Colusa County

CALIFORNIA ENERGY COMMISSION

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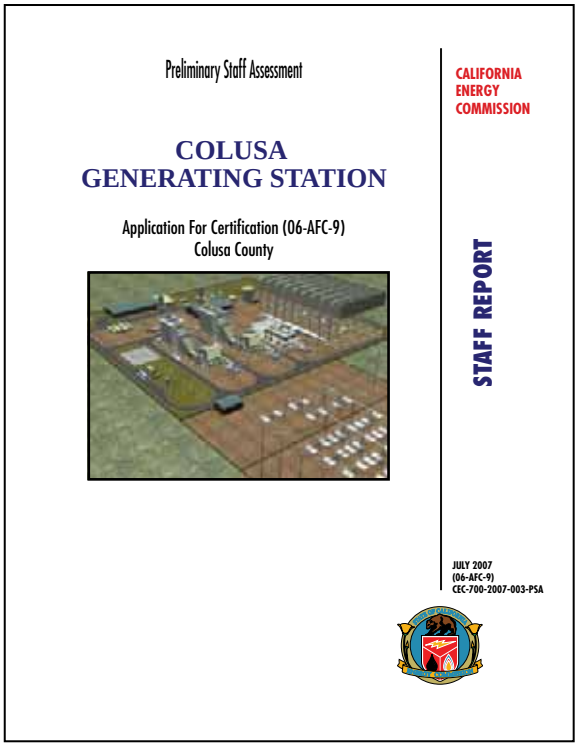


CALIFORNIA ENERGY COMMISSION

SITING OFFICE

Jack Caswell
Project Manager

Roger E. Johnson
Siting Office Manager

SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION

Terrence O'Brien
Deputy Director

COLUSA GENERATING STATION PROJECT
(06-AFC-9)
PRELIMINARY STAFF ASSESSMENT

EXECUTIVE SUMMARY

Jack W. Caswell, Project Manager

INTRODUCTION

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent analysis and preliminary recommendation on the Colusa Generating Station (CGS or project). The proposed project is under the Energy Commission's jurisdiction and cannot be constructed or operated without the Energy Commission's certification. This PSA examines engineering, environmental, public health and safety aspects of the proposed project. The PSA analysis is based on the information provided by the applicant and other sources available at the time the analysis was prepared. The PSA 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. After a 30-day public comment period on the PSA, staff will issue its testimony in the form of the Final Staff Assessment (FSA).

The Energy Commission staff has the responsibility to complete an independent assessment of the project's potential effects on the environment, the public's health and safety, and whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends conditions of certification to mitigate potentially significant adverse environmental effects and conditions for construction, operation and eventual closure of the project if approved by the Energy Commission. This PSA is not a decision document for these proceedings, nor does it contain findings by the Energy Commission; it is a preliminary staff recommendation related to environmental impacts and the project's compliance with local, state and federal LORS.

The FSA 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, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make findings and provide a final decision after the Committee's publication of its Presiding Member's Proposed Decision (PMPD).

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

PROJECT LOCATION AND DESCRIPTION

The proposed CGS site is located on a 3-acre portion of a 100-acre parcel, Assessor parcel No. 11-040-024, Section 35, Township 18N, Range 4W, MD B and M, in Colusa County. The site is west of the existing PG&E gas compressor station located 6 miles north of the community of Maxwell, 14 miles north of the community of Williams and 4 miles west of I-5. The site will be accessed by Dirks Road, currently providing access to

the PG&E gas compressor station. The CGS will be a combined cycle power plant producing a nominal 660 megawatts (MW) of electricity, with two natural gas-fired turbine generators using heat recovery steam generators (HRSG), providing steam for one steam turbine generator. Linear facilities include four double-circuit 230-KV transmission lines looping to the power plant's new substation and PG&E's existing transmission lines located approximately 1,800 feet to the west, 1,500 feet of 8-inch natural gas pipeline, 2,700 feet of 4-inch water pipeline constructed from the Tehama-Colusa Canal west of the project site. A more complete description of the project that includes site layout and regional maps is contained in the **Project Description** section of this PSA.

PUBLIC AND AGENCY COORDINATION

Prior to the publication of the PSA, the Energy Commission conducted a publicly noticed business meeting accepting the CGS Application for Certification (AFC) as complete and allowed comments on the proposed project. Commission staff sent notices informing property owners, libraries and agencies of the proposed project and sent copies of the AFC to libraries, agencies and organizations. The Committee of two Commissioners assigned to oversee the CGS project procedure conducted an Informational Hearing and Site Visit on January 25, 2007 in Williams, CA.

Staff conducted a publicly noticed Data Response and Issue Resolution Workshop at the Energy Commission on February 21, 2007. The workshop allowed staff and the applicant to discuss data requests, data responses and resolve issues. Additionally, the workshop provided an opportunity to hear opinions on the project and the proceeding from intervenors, interested agencies, and members of the public. Staff also has coordinated directly with the California Independent System Operator and relevant local, state and federal agencies; such as the Colusa County Air Pollution Control District, Colusa County Planning and Building Department, Maxwell Fire Protection District, Central Valley Regional Water Quality Control Board, US Fish and Wildlife Service, US Army Corp of Engineers, the Glenn-Colusa Irrigation District and Native American tribes and other interested parties.

Written comments on the PSA will be taken into consideration in preparing the FSA. Written comments on the PSA are due to the Energy Commission no later than August 22, 2007 for consideration in the FSA. A workshop on the PSA is being scheduled on August 22, 2007. All workshops will be publicly noticed separately.

ENVIRONMENTAL JUSTICE

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

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

Staff has reviewed Census 2000 data for Colusa and Glen Counties that shows the minority population by census block is 18.0 percent minority and 47.0 percent low-income which does not exceed staff's screening threshold of greater than fifty percent within a six-mile or one-mile radius of the proposed CGS project (**See Socioeconomics Figure 1**). Additionally, socioeconomics data shows that the population below the poverty level is 13.0 percent and 22.0 percent within a six-mile and one-mile radius. Staff has determined there no concentrations of minority and low–income populations within the six-mile radius of the project. Therefore, staff has concluded that the project does not result in any significant unmitigated impacts to an environmental justice population.

STAFF'S ASSESSMENT

Each technical area section of the PSA contains a discussion of impacts, and where appropriate, mitigation measures and conditions of certification. The PSA includes staff's assessments of:

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

OVERVIEW OF STAFF'S CONCLUSIONS

Staff's preliminary analysis indicates that, with the exception of Land Use, Soils and Water Resources, Worker Safety and Fire Protection, Hazardous Materials, and Transmission System Engineering the project's impacts are being mitigated to levels less than significant. Land Use conclusions indicate the project is not LORS compliant with the County of Colusa's general plan and zoning ordnances. Soils and Water Resources concludes that the project will require evidence of an executed water agreement between the CGS, Glenn-Colusa Irrigation District and Colusa County in order to meet LORS compliance. Worker Safety and Fire Protection and Hazardous Materials conclusions indicate the Maxwell Fire Protection District has unresolved and unmitigated impacts due to the proposed project's impacts. The issues associated with those impacts are currently being discussed with the CGS, fire district and Colusa

County representatives. Additionally, staff is evaluating data responses from the project applicant on the potential downstream impacts beyond the first point of interconnection to the Western Area Power Administration's (Western) transmission system. Staff will provide an analysis on those impacts as an appendix to the Transmission System Engineering section in the FSA.

The following table summarizes the potential environmental impacts and LORS compliance for each technical section. Details on the potential impacts and mitigation for those impacts are found in each technical section.

Technical Sections Status Table

Technical Discipline	Impacts Mitigated	Complies with LORS
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	N/A	N/A
Facility Design	Yes	Yes
Geology, and Paleontological Resources	Yes	Yes
Hazardous Materials	Unresolved	Unresolved
Land Use	Unresolved	Unresolved
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomics	Yes	Yes
Soil and Water Resources	Unresolved	Unresolved
Traffic and Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Unresolved	Unresolved
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety/Fire Protection	Unresolved	Unresolved

TECHNICAL SECTIONS REQUIRING ADDITIONAL INFORMATION

A summary of unresolved issues is discussed below for the following technical areas:

LAND USE

The CGS project does not comply with the current Colusa County general plan and zoning ordinance provisions applicable to the proposed site and would require a height variance in order to meet LORS compliance. Construction of an electric power plant would require a County General Plan amendment and zoning ordinance change for the site. Staff anticipates completion of the county land use amendments to occur in September 2007. A discussion on scheduling issues for the completion of the above

county requirements and any issues associated with LORS compliance will be pursued at a PSA workshop. Results of the PSA workshop and information filed on this issue will be reflected in the FSA.

SOILS AND WATER RESOURCES

The impacts to surface-water resources could not be determined without all terms of the water agreement and a description of all users and customers that would be party to the applicants propose water agreement. Final execution of the three-party agreement between, E&L Westcoast, LLC, Glenn-Colusa Irrigation District, and the County of Colusa would provide a reliable long-term water supply for the Colusa Generating Station that is consistent with state laws and water-use policies. Staff will need evidence of this agreement for the completion of the Final Staff Assessment.

WORKER SAFETY AND FIRE PROTECTION AND HAZARDOUS MATERIALS

The applicant, Maxwell Fire Protection District (MFPD) and County of Colusa are discussing the impacts directly associated with the proposed CGS project. The volunteer district continues to have concerns on their ability to respond to an emergency at the proposed project site. The primary concerns from the district are: a) the lack of staff and the funds for proper training of that staff b) the lack of proper fire fighting equipment and the funds for that equipment. The Hazardous Materials technical section identifies concerns with the lack of properly trained MFPD staff as the first off-site responder to a hazardous materials release. Staff will pursue discussions at a PSA workshop in order to find possible resolutions to the issues. The results of the workshop and any information filed by the parties involved with this issue will be reflected in the FSA.

TRANSMISSION SYSTEM ENGINEERING

In order to understand and analyze the impacts of the proposed CGS project to Western's transmission system, staff provided a set of data requests to the applicant on May 16, 2007. The required additional information focused on the CGS project impacts to the Western Shasta-Flanagan-Keswick transmission line. The project impacts are beyond the first point of interconnection for the CGS project but are a reasonable foreseeable action as a direct result of the development of the project. Western has concurred with the applicant and the Commission that impacts to their transmission system will require mitigation measures by the proposed CGS project. Staff received data responses in June 2007. The impacts to Western's transmission system and any associated mitigation are not under the authority of the Energy Commission but will be analyzed under a general review analysis as required under CEQA. Staff's analysis on the CGS project impacts to the Western transmission system will be published in the FSA.

CONCLUSIONS

This PSA is a preliminary document and as such, is part of the process of discovery and the resolution of issues identified in this document. The resolution of the issues discussed and agreements between the applicant, appropriate agencies and involved

parties will be pursued by staff at the PSA workshop prior to publication of the FSA. Staff views the following information as necessary in order to provide a complete FSA analysis.

Summary of information pending resolution:

- Evidence that the proposed project and site comply with the county land use ordinances;
- Evidence that the proposed project has an executed water agreement with all parties that would be consistent with state laws and water-use policies;
- Agreement between the applicant, Maxwell Fire Protection District, County of Colusa and Commission staff, that the fire protection and hazardous materials impacts from the proposed power plant would be fully mitigated to a level of less than significant;
- Completion of staff's analysis for the project impacts to the Western Area Power Administration's transmission system; and
- Completion of staff's FSA analysis based on workshop discussions and submittal of any additional information that may be requested or presented at the PSA workshop.

INTRODUCTION

Jack W. Caswell, Project Manager

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the E&L Westcoast, LLC (E&LW or Applicant), Application for Certification (AFC). The PSA is a staff document. It is neither a Committee document nor a draft Energy Commission decision. The Committee is comprised of two commissioners who have been assigned to the project to oversee the progress of the case. The PSA describes the following:

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

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

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

ORGANIZATION OF THE STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, Project Analysis, 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: air quality, public health, worker safety and fire protection, transmission line safety, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. A discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report follow the chapters.

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

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

ENERGY COMMISSION SITING PROCESS

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

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

In addition, staff must assess the completeness and adequacy of the health and safety standards and the reliability of power plant operations (Cal. Code Regs., tit. 20, §1743[b]). Staff is required to coordinate with other agencies to ensure that applicable

laws, ordinances, regulations, and standards are met (Cal. Code Regs., tit. 20, §1744[b]).

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

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

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

The staff's assessment is only one piece of evidence that the Committee will consider 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 provides a forum for the Committee to receive comments from the public and other governmental agencies.

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

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

by the Energy Commission. Staff's proposed Compliance Monitoring Plan and General Conditions are included at the end of this PSA.

AGENCY COORDINATION

As noted above, the Energy Commission's 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 Energy Commission typically seeks comments from and works closely with other regulatory agencies that administer laws, ordinances, regulations, and standards 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 California Air Resources Board. Additionally, the Energy Commission works closely with local air and water districts and building and planning departments to include local government office officials.

PROJECT DESCRIPTION

Jack W. Caswell, Project Manager

INTRODUCTION

On November 6, 2006, E&L Westcoast, LLC (E&LW or Applicant), a subsidiary of Competitive Power Ventures, filed an Application for Certification (AFC) seeking approval from the California Energy Commission (Energy Commission) to develop the Colusa Generating Station (CGS). On December 13, 2006, the Energy Commission accepted the AFC as complete, thus starting the Energy Commissions' formal review of the proposed CGS project.

PURPOSE OF PROJECT

The CGS project is in response to Pacific Gas and Electric Company's (PG&E) "Request for Offer" and a contract agreement signed with E&LW in 2006. The contract between PG&E and E&LW would transfer the ownership and operation of the proposed power plant to PG&E after a license is issued and a commissioning phase of the facility is completed.

PROJECT LOCATION

The proposed CGS would be located in the unincorporated portion of Colusa County, approximately 6 miles north of the community of Maxwell and 14 miles north of the community of Williams. The site is 4 miles west of Interstate 5 (I-5). It is generally bounded by the Tehama-Colusa Canal to the west, the Glenn/Colusa county line to the north, the Glenn-Colusa Canal to the east, and Dirks Road to the southeast. The project would be located within a 31-acre portion of a 100-acre parcel site leased from the Holthouse Ranch. The PG&E Delevan natural gas compressor station and Cottonwood to Vaca-Dixon transmission corridor (230-kilovolt overhead electric lines) are located immediately to the east of the proposed project site (**PROJECT DESCRIPTION Figures 2 and 3**). Grazing land surrounds the 100-acre leased area immediately to the west, north, and south. The nearest actively farmed land is Emerald Farms, located approximately one mile southeast of proposed project location.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The proposed CGS project is a 660-megawatt (MW) natural gas-fired, dry-cooled, combined-cycle electric generating facility. The project would use air-cooled condenser ("dry") cooling technology for its operation, thereby significantly reducing the amount of water needed for plant operation. The project would also employ a zero-liquid discharge system where the water from the combustion turbine generator's evaporative coolers is recovered for reuse in the plant, and the remaining salts are concentrated for disposal off site. As required, makeup water is added to replace the water that is lost to evaporation blowdown (E&LW 2006a). Output of the generators would be connected to step-up transformers and then to a new CGS switchyard that would require 12 new

lattice transmission towers for the 1,800 foot electrical tie-in to PG&E's existing 4 double circuit 230-kV transmission lines.

The new power plant site access road, new water supply intake access road, and new transmission interconnection would require an additional 2.7 acres (**PROJECT DESCRIPTION Figures 1 and 2**).

The following are the major components of the power plant (**PROJECT DESCRIPTION Figures 4 and 5**):

- two General Electric (GE) Power Systems Frame 7FA combustion turbine generators (CTGs) equipped with dry low NOx combustors designed for natural gas;
- two multi-pressure heat recovery steam generators (HRSGs) with duct burners and a selective catalytic reduction system (to be used with aqueous ammonia);
- one steam turbine generator (STG) system with multi-cell air cooled condenser and associated auxiliary system and equipment (i.e., lubrication oil system including oil coolers and filters and generator coolers);
- a 1,000-kilowatt (kW) standby diesel generator for extended utility outages during maintenance and shutdowns;
- 12 new transmission towers will be required to loop four existing double-circuit 230-kilovolt (kV) transmission lines to interconnect to the existing PG&E transmission system;
- a 4-inch, 2,700-foot water pipeline providing water to the project from the Tehama-Colusa Canal and a related 12-foot wide permanent gravel access road that would parallel the pipeline;
- an 8-inch, 1,500-foot natural gas pipeline from PG&E's Compressor Station; and
- a 2,500-foot paved access road from the existing PG&E natural gas compressor station to the facility site.

NATURAL GAS SUPPLY

Natural gas would be supplied to the CGS site via a new 8-inch, 1,500-foot-long pipeline interconnected to the PG&E gas transmission system located east of the proposed project site. The pressure reducing/metering station would be located within the CGS facility. The pipeline tap would be located adjacent to the existing PG&E natural gas compressor station (**PROJECT DESCRIPTION Figure 4**).

WATER SUPPLY

The CGS project would require approximately 126 acre-feet of water per year to meet its operational needs. The Glenn-Colusa Irrigation District would provide water to the CGS via Colusa County and the Tehama-Colusa Canal. The Central Valley Project provides water to the Glenn-Colusa Irrigation District. Construction of a new 4-inch diameter, 2,700-foot-long water pipeline from the Tehama-Colusa Canal to the CGS site would be required (**PROJECT DESCRIPTION Figure 4**).

WASTEWATER DISCHARGE

Wastewater collected by sample drains, equipment drains, equipment leakage, and area wash downs would be collected in a general plant drainage system and routed to an oily water separator and then sent to a stormwater detention basin. This stormwater detention basin would not receive off-site stormwater runoff. The CGS site is located above surrounding stormwater runoff and the 100-year floodplain. The CGS processed water treatment system would send water through a reverse osmosis system and electro-deionizer unit. The recycle feed water becomes a distillate water from an evaporator unit of the zero liquid discharge system (ZLD). The wastewater concentrates are collected in an evaporating pond and trucked to a licensed waste disposal facility.

HAZARDOUS WASTE

Hazardous wastes generated by the plant would include spent selective catalytic reduction and oxidation catalyst, used oil filters, used oil and chemical waste. Used oil will be recovered and recycled by a waste recycling contractor. All other wastes will be disposed of if accordance with applicable laws, ordinances, regulations and standards at appropriately licensed waste disposal facilities.

TRANSMISSION SYSTEM

As part of the CGS project, a new switchyard connected to step-up transformers linked to the CTGs would be constructed immediately north of the power plant site which would be operated by PG&E. Generation from the CGS would be delivered to PG&E's high voltage transmission grid (the 230-kV Cottonwood to Vaca-Dixon transmission corridor), located approximately 1,800 feet east of the proposed switchyard. The transmission interconnection would require the installation of approximately 12 new steel lattice transmission towers to loop four 230-kV double-circuit trans mission lines between the PG&E right-of-way and the CGS switchyard. The structure heights vary from 100 to 125 feet depending on configuration of the site and terrain (**PROJECT DESCRIPTION Figure 4**).

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, E&LW proposes to initiate construction of the CGS in the spring of 2008, and be completed by spring of 2010, provided there are no delays. The on-site construction workforce would peak at 669 workers in April of 2009. Construction costs are estimated to be $450 to $500 million. Operation of the CGS will require 31 full-time permanent staff. The plant will be staffed 7 days a week, 24 hours a day. Primary construction access would be from I-5 to Delevan Road to McDermott Road to Dirks Road. On the northeast side of the site, 43 acres of the 100-acre parcel will serve as a laydown area accommodating storage of construction materials, equipment, construction offices, and parking, which the Applicant proposes to restore and re-vegetate after construction is complete (**PROJECT DESCRIPTION Figure 3**).

EXISTING BRIDGE AND ROAD MODIFICATIONS

The Teresa Creek Bridge (on McDermott Road, 5/8-mile north of Delevan Road) cannot currently accommodate heavy construction truck traffic and would be replaced by the applicant. Replacement of the bridge will entail one of two options. One option would be

to install a temporary bridge to the east of the existing bridge prior to replacement of Teresa Creek Bridge that would be a clear span bridge or a prefabricated bridge. The second option would be to detour traffic using McDermott Road to an alternate route during construction of the new bridge (E&L 2006a, p. 3-20, 3-21). The new bridge would either be a clear span bridge or a prefabricated bridge. Currently the plan for the bridge type selected is dependent upon the project schedule (**PROJECT DESCRIPTION Figure 3**).

The Glenn-Colusa Canal Bridge (Dirks Road west of I-5) cannot currently accommodate heavy construction or two-way truck traffic. The bridge was originally designed for a 40-ton load but is currently rated for 20-ton loads. The new bridge will be a free-span steel beam and concrete structure approximately 100 feet long by 30 feet wide. This bridge design would provide two 12-foot lanes with 3-foot shoulders giving unimpeded two-way traffic flow. No piers will be constructed in the canal to support the bridge. The east approach will be located approximately 20-feet to the north of the existing bridge and the west approach will located approximately 40-feet north of the bridge. This new bridge would be capable of handling the heaviest loads required for the construction and operation or the power plant. The existing bridge deck would be left in place or the deck removed. The original bridge approaches would be graded to match the surrounding land contours and seeded with grass native to the region (**PROJECT DESCRIPTION Figure 3**).

Delevan and McDermott road widening will be required. The Applicant proposes to widen the northeastern and southeastern corners of the intersection of Delevan and McDermott roads in order to accommodate wide-turning radius heavy construction vehicles. The applicant would grade and place gravel at these corners. This would require relocation of the stop sign and telephone conduit box currently located at the northeastern corner of the intersection (**Project Description Figure 3**).

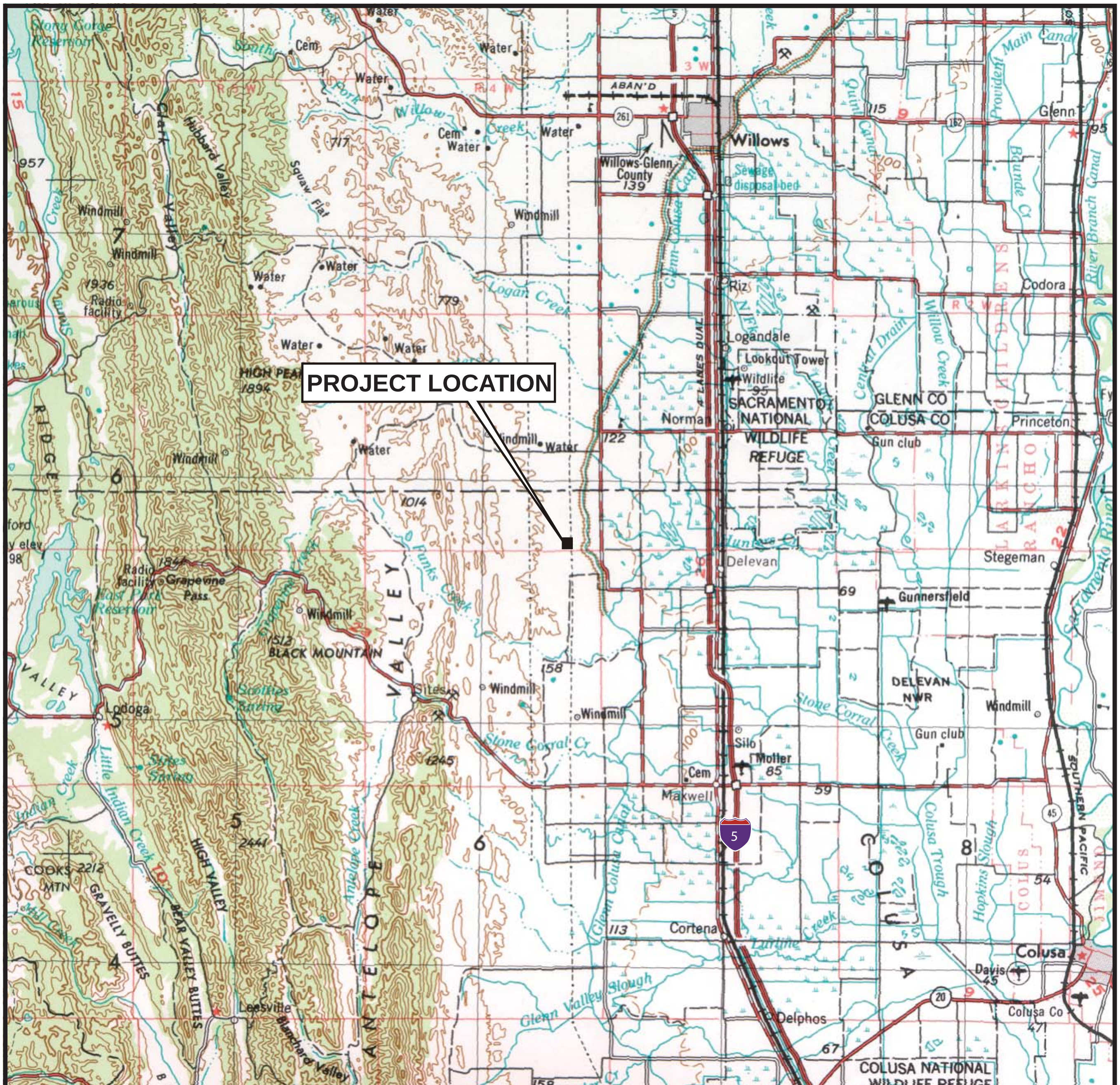
REFERENCES

E&LW (E&L Westcoast, LLC). 2006a. E&LW, LLC / A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

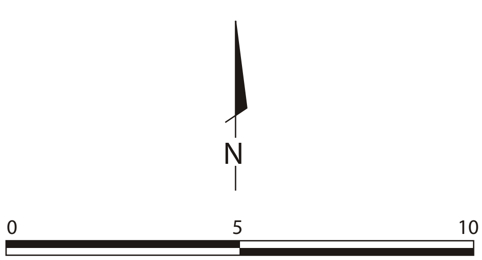
URS. 2006a. URS/ A. Walsh (tn: 38617). Supplement in response to the CEC Data Adequacy review. Submitted to CEC/J. Caswell/Docket Unit on 12/12/2006.

L&W. 2007a. Latham & Watkins/P. Kihm (tn: 39247). Applicant's Response to Data Request 1 through 116. Submitted to CEC/ Docket Unit on 2/13/2007.

PROJECT DESCRIPTION - FIGURE 1
Colusa Generating Station - Regional Map



Source:
USGS Topographic-Bathymetric Series
Ukiah, California, 1979

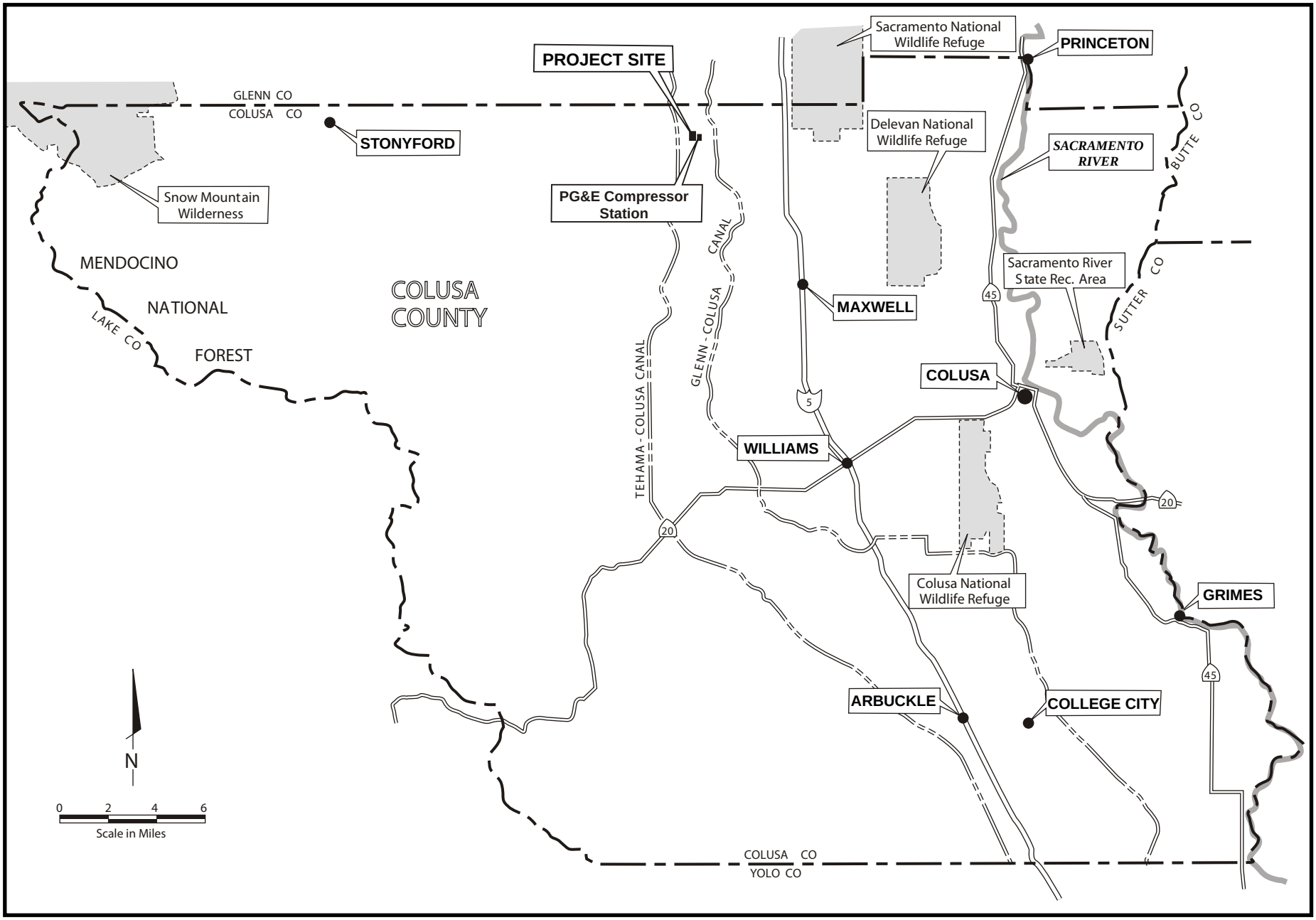


Scale in Miles
1:250,000

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2007
SOURCE: AFC Figure 1.1-1

PROJECT DESCRIPTION - FIGURE 2

Colusa Generating Station - Local Communities

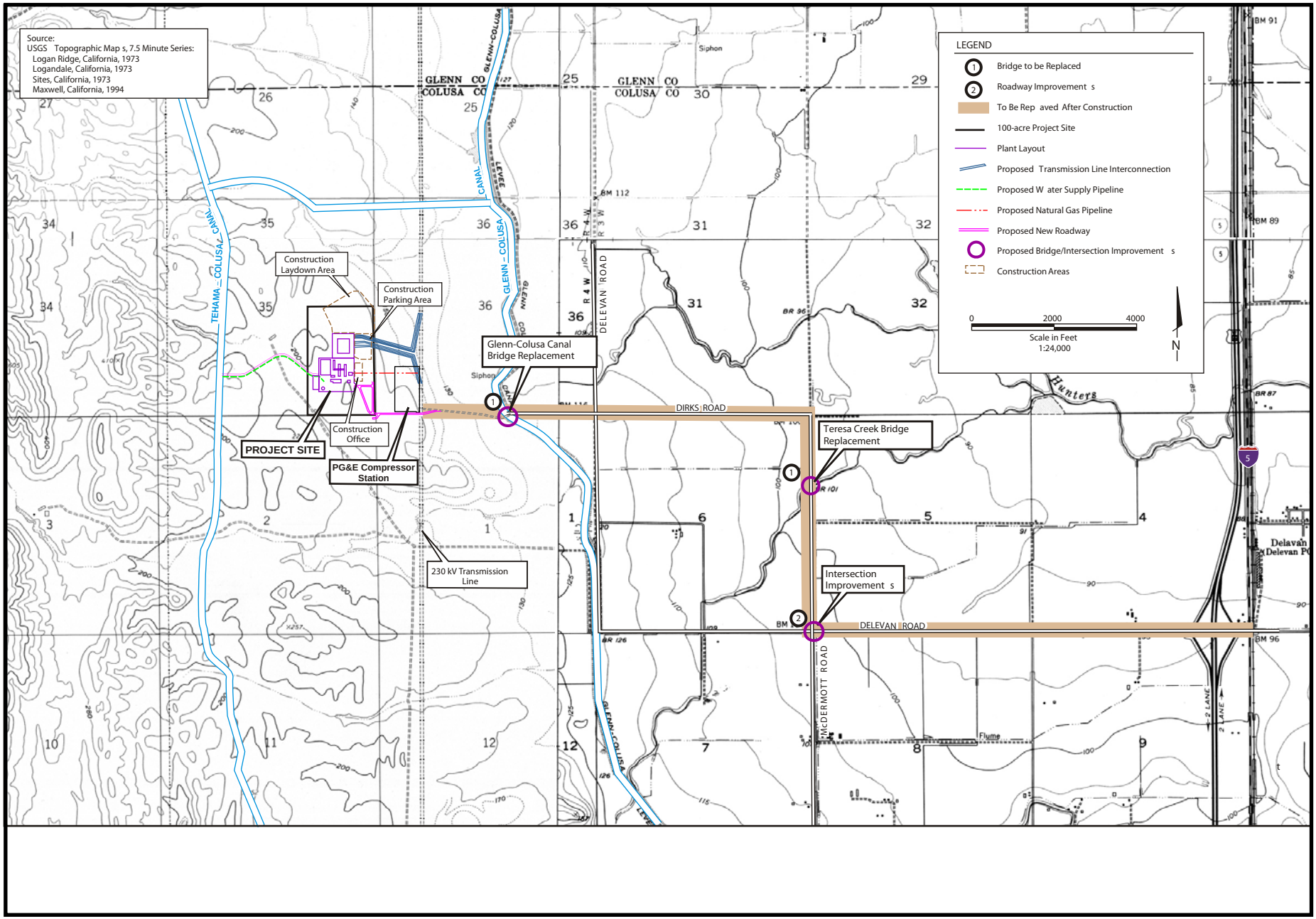


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2007

SOURCE: AFC Figure 8.4-1

PROJECT DESCRIPTION - FIGURE 3

Colusa Generating Station - Construction Locations & Route

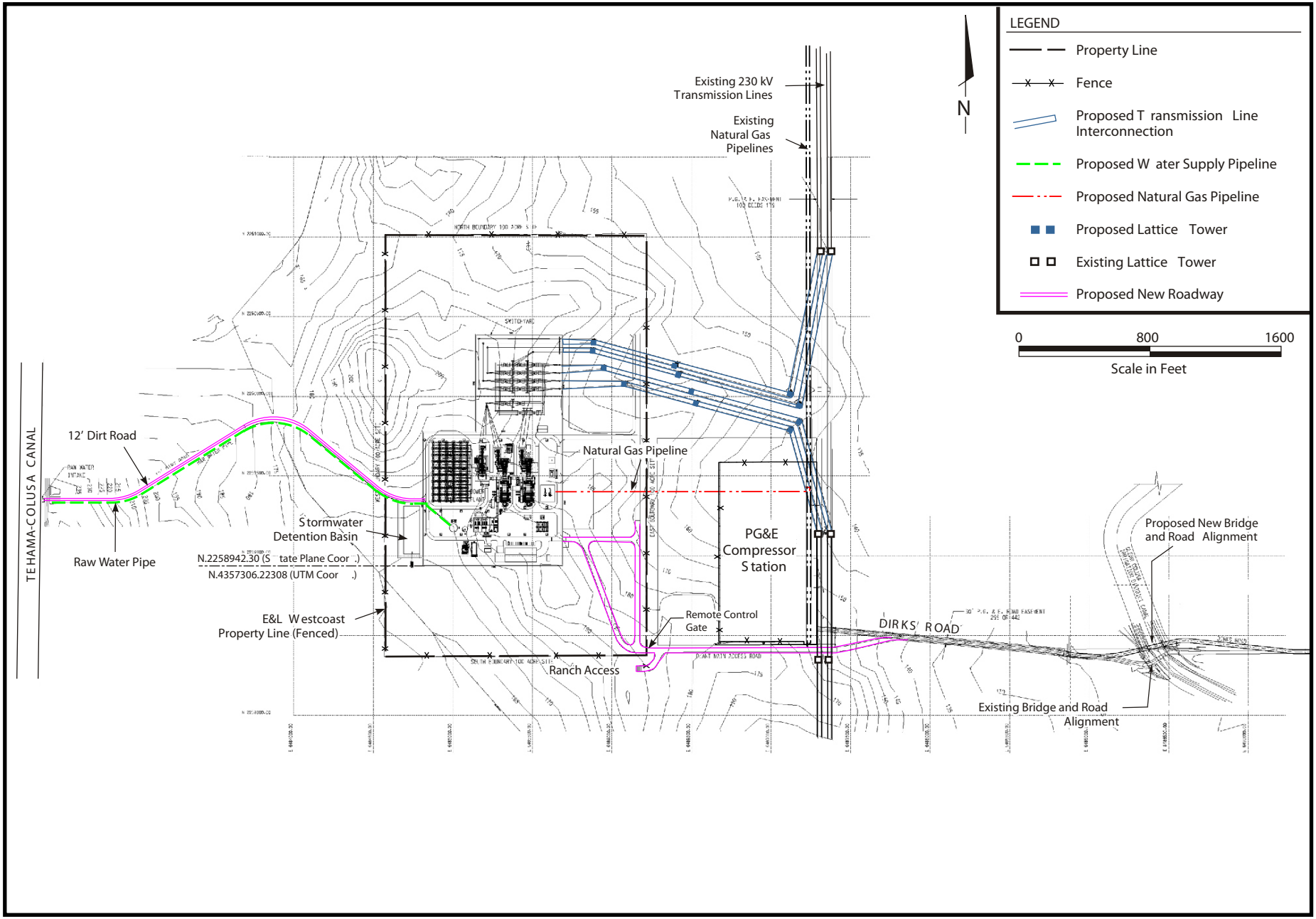


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2007

SOURCE: AFC Figure 8.10-2

PROJECT DESCRIPTION - FIGURE 4

Colusa Generating Station - Site Layout & Linear Facilities



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2007

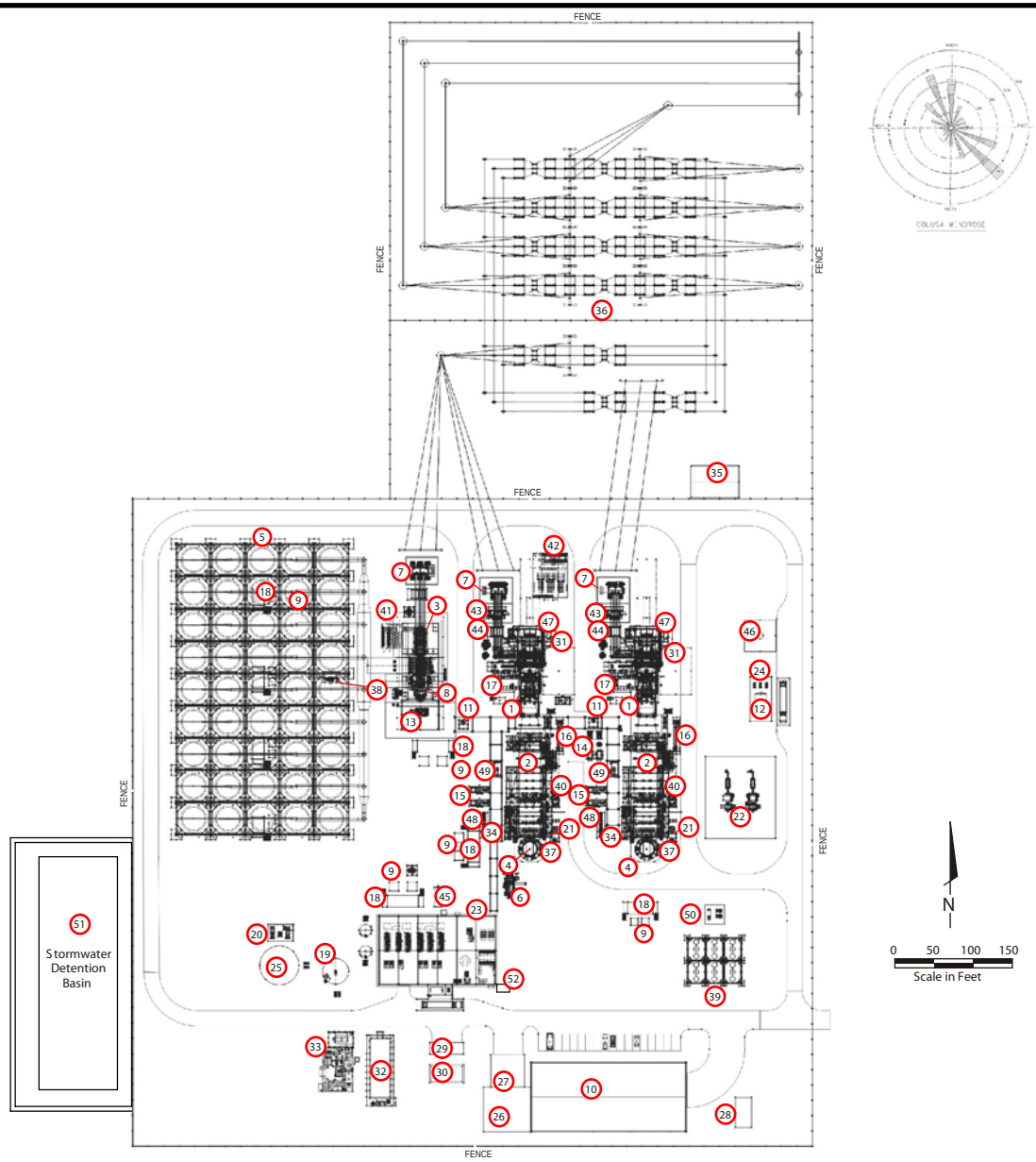
SOURCE: AFC Figure 3.3-1

PROJECT DESCRIPTION - FIGURE 5

Colusa Generating Station - Plot Plan

LEGEND

1 Combustion T urbine
2 Heat Recovery System Generator (HRSG) with SCR & Oxidation Cat alyst
3 S team T urbine Generator
4 HRSG Exhaust S tack
5 Air Cooled Condenser
6 Auxiliary Boiler
7 Main T ransformers
8 S team T urbine
9 Electrical Auxiliary Transformers
10 Control Room Administration, W arehouse, and Maintenance Bldg.
11 Area Sump
12 Ammonia S torage Tank
13 STG Lube Oil Skid
14 Air Compressors
15 Boiler Feed W ater Pump
16 Fuel Gas Sep arator and Heating
17 GTG Support Skids
18 Power Distribution Center
19 Demineralized W ater S torage Tank
20 Fire W ater Pump Skid
21 HRSG Blowdown Tank and Sump
22 Gas Metering and Regulating with Fuel Gas Filter/Sep arators
23 Water T reatment Area
24 Ammonia T ransfer Pumps
25 Raw/Firewater T ank
26 General S torage
27 Equipment Shelter
28 Septic T ank
29 Bulk S torage Building
30 Hazardous W aste S torage Area
31 CO_2 Bottles
32 Waste W ater Basin
33 Water Evaporator Area
34 Pipe Rack
35 Switchyard Control House
36 230 kV Switchyard
37 CEMS Equipment Room
38 Condensate Tank and Pump s
39 Fin Fan Coolers
40 Ammonia Dilution Skid
41 S team Turbine Electrical Equipment
42 Electrical Switchgear Building
43 Unit Auxiliary Transformer
44 Generator Breakers
45 Emergency Diesel Generator
46 Hydrogen S torage Area Tank
47 CT Air Inlet
48 Phosphate Feed Skid
49 Sample Panel
50 Auxiliary Cooling W ater Pump s & Heat Exchanger
51 S tormwater Detention Basin
52 Oil/W ater Sep arator



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITY SITING DIVISION, MAY 2007

SOURCE: AFC Figure 3.4-1

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

William Walters

SUMMARY OF CONCLUSIONS

California Energy Commission staff's analysis indicates that the Colusa Generating Station project would comply with all applicable Laws, Ordinances, Regulations, and Standards (LORS) and should not result in significant air quality impacts. The project has secured emission reduction credits (ERCs), with a minor exception for SO_2 which staff has addressed in Condition of Certification **AQ-SC7**, in sufficient quantity to meet Colusa County Air Pollution Control District (CCAPCD or District), requirements and to fully offset all nonattainment pollutants and their precursors at a minimum ratio of 1:1.

Staff has assessed both the potential for localized impacts and regional impacts for the project's construction and operation, and as a product of this analysis staff has recommended mitigation and monitoring requirements that should provide mitigation and monitoring sufficient to reduce the adverse construction and operating emission impacts to less than significant.

Staff has received a comment from the California Air Resources Board (ARB) regarding the use of VOC for NOx interpollutant offsets, as discussed in the Agency Comment section of this document. This issue needs to be resolved between ARB and the Colusa County Air Pollutant Control District prior to completion of the Final Staff Assessment. Additionally, the construction modeling impact analysis (see AIR QUALITY Table 22) and the cumulative impact analysis (see AIR QUALITY Table 32) need to be refined to properly assess reasonably conservative maximum emission impacts for the project.

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to E&L Westcoast, LLC's (E&LW), or applicant's, proposed construction and operation of the Colusa Generating Station (CGS) project. Criteria air pollutants are defined as those for which a state and/or federal ambient air quality standard has been established to protect the public health. The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), coarse particulate matter (PM10) and fine particulate matter (PM2.5). In addition, volatile organic compound (VOC) emissions are analyzed because they are precursors to both ozone and particulate matter. Because NO_2 and SO_2 readily react in the atmosphere to form other oxides of nitrogen and sulfur, respectively, the terms nitrogen oxides (NOx) and sulfur oxides (SOx) are also used when discussing these two pollutants.

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

- Whether the CGS is likely to conform with applicable federal, state and Colusa County Air Pollution Control District air quality laws, ordinances, regulations, and standards (Title 20, California Code of Regulations Section 1744 [b]),

- Whether the CGS is likely to cause significant new violations of air quality standards or contribute to existing violations of those standards (Title 20, California Code of Regulations Section 1742 [b]), and
- Whether the mitigation proposed for the CGS is adequate to lessen the potential impacts to a level of insignificance (Title 20, California Code of Regulations section 1742 [b]).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Air Quality Table 1 summarizes the applicable laws, ordinances, regulations, and standards that can apply to the CGS.

AIR QUALITY Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Title 40, Code of Federal Regulations (CFR) Section 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to CCAPCD. Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for attainment pollutants. A major source for a simple cycle combustion turbine is defined as any one pollutant exceeding 250 tons per year. Since the emissions from the CGS are expected to exceed 250 tons per year, PSD does apply.
40 CFR 60 Subpart KKKK	New Source Performance Standard for gas turbines: 15 parts per million (ppm) NOx at 15%O_2 and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT will be more restrictive. Enforcement has not been delegated to CCAPCD and compliance demonstration requirements will be included in the U.S. EPA PSD permit.
40 CFR Part 70	Title V: federal permit. Title V permit application required within one year of start of operation. Permitting and enforcement delegated to CCAPCD.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement delegated to CCAPCD.
State	
Health and Safety Code (HSC) Sections 40910–40930	Permitting of source needs to be consistent with approved Clean Air Plan.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.

Local – Colusa County Air Pollution Control District (CCAPCD) Rules and Regulations	
Regulation I – General Provisions	Sets forth requirements and standards for stack monitoring, source sampling, recordkeeping, and breakdown events.
Regulation II – Prohibitions	Sets forth the restrictions for visible emissions, odor nuisance, various air emissions, and fuel contaminants. Also specifies additional performance standards for specific emission sources, such as industrial boilers, degreasers, and stationary internal combustion engines.
Regulation III – Permits	Sets forth the regulatory framework of the application for and issuance of construction and operation permits for new, altered, and existing equipment. Included in these requirements are the federally delegated requirements for New Source Review and Title V Permits and the Acid Rain Program. Regulation III Rule 3.6 establishes the pre-construction review requirements for new, modified, or relocated facilities in conformance with the federal New Source Review regulation to ensure that these facilities do not interfere with maintenance of the national ambient air quality standards and that future economic growth in Colusa County is not unnecessarily restricted. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements. Regulation III, Rule 3.17 defines the permit application and issuance as well as compliance requirements associated with the Title V federal permit program. Any new source which qualifies as a Title V facility must obtain a Title V permit within 12 months of starting operation modification of that source. This rule also defines the requirements for the Acid Rain Program, including the requirement for a subject facility to obtain emission allowances for SOx emissions as well as monitoring SOx, NOx, and CO_2 emissions from the facility.
Regulation V – Procedures before the Hearing Board	Establishes the procedures for reporting emergencies and emergency variances.

SETTING

CLIMATE AND METEOROLOGY

The proposed CGS would be located at an undeveloped 100-acre site located in an agricultural area in northern Colusa County near the Colusa County–Glenn County border, less than 1.5 miles south of the county line. The foothills of the Coastal Range are located approximately one mile to the west of the subject site. The proposed site is located approximately 4 miles west of Interstate 5, 6 miles north northeast of Maxwell, 11 miles south-southwest of Willows, and 14 miles north-northwest of Williams.

Colusa County is located in the west central portion of the Sacramento Valley Air Basin (SVAB). The Sacramento Valley is bounded to the west by the Coast Ranges and to the east by the Sierra Nevada. The subject site is at an elevation of approximately 180 feet above mean sea level (AMSL) and slopes moderately to the east. Logan Ridge is located approximately two miles to the west at an elevation of 500 feet AMSL.

The climates of California are a result of topography and the position of the semi-permanent Pacific High, a center of high atmospheric pressure in the Pacific Ocean off the California coast. During the summer, the High moves over northern California and Nevada and effectively blocks the movement of Pacific storm systems into California, causing the annual summer drought. During the winter, the High weakens and moves to the southwest, allowing storms and frontal systems to move into northern and central California. The Coast Range and the higher Sierra Nevada act as barriers to these storms during the wet seasons.

The climate of north central Colusa County in summer is typically hot and dry from May through September. In the summer, the average high temperature is approximately 91°F, and the average low temperature is approximately 59°F. High temperatures commonly exceed 95°F during the summer months. The total average rainfall is less than an inch during the summer months. The winter months are typically cool and over 80 percent of the total annual rainfall of 16.9 inches per year, almost 14 inches, typically falls from November through March. The average high temperature during winter is approximately 58°F, and the average low temperature is approximately 40 °F (WC, 2007).

During the summer, prevailing winds are from the south with average speeds of 8.5 miles per hour (mph). An atmospheric inversion layer often forms during the summer months, restricting vertical mixing of the air. During the winter, wind patterns in the Sacramento Valley are predominately from the south, although northerly winds frequently prevail, depending on the direction of storm systems. Wind speeds average 6 mph. Inversion layers often occur in the winter, resulting in temperature inversions that form a heavy fog, known as "Tule fog," particularly in December and January.

EXISTING AIR QUALITY

The project is located within the jurisdiction of the Colusa County Air Pollution Control District. The applicable federal and California ambient air quality standards (AAQS) are presented in **AIR QUALITY Table 2**. As indicated in this table, the averaging times for the various air quality standards (the duration over which they are measured) range from one hour to annual average. The standards are read as a mass fraction, in parts per million (ppm), or as a concentration, in milligrams or micrograms of pollutant per cubic meter of air (mg/m^3 or $\mu g/m^3$).

AIR QUALITY Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.08 ppm (157 µg/m^3)	0.070 ppm (137 µg/m^3)
	1 Hour	—	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35.0 ppm (40 mg/m^3)	20.0 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 µg/m^3)	— [a]
	1 Hour	—	0.25 ppm (470 µg/m^3) [a]
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	—	0.25 ppm (655 µg/m^3)
Respirable Particulate Matter (PM10)	Annual	—	20.0 µg/m^3
	24 Hour	150.0 µg/m^3	50.0 µg/m^3
Fine Particulate Matter (PM2.5)	Annual	15.0 µg/m^3	12.0 µg/m^3
	24 Hour	35.0 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25.0 µg/m^3
Lead	30-Day Average	—	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: ARB, 2007a.

[a] California Air Resources Board has approved a revised one-hour standard for NO_2 (0.18 ppm or 338 ug/m^3) and a new annual standard for NO_2 (0.030 ppm or 56 ug/m^3); however, these standards have not completed the state's official approval process at the time of the completion of this Preliminary Staff Assessment, and it is unknown if they will be officially approved prior to the completion of the Final Staff Assessment.

The U.S. Environmental Protection Agency (U.S. EPA), California Air Resource Board (ARB), and the local air district classify an area as attainment, unclassified or unclassifiable, or nonattainment, depending on whether or not the monitored ambient air quality data show compliance, are insufficient, or are non-compliant with the ambient air quality standards, respectively. The CGS is located within the Sacramento Valley Air Basin (SVAB) and, as stated above, is under the jurisdiction of the Colusa County Air Pollution Control District. This area is designated as non-attainment for both the state ozone and PM10 standards and designated as attainment or unclassified for the other state standards and for all federal standards. **AIR QUALITY Table 3** summarizes federal and state attainment status of criteria pollutants for Colusa County within the SVAB.

AIR QUALITY Table 3
Federal and State Attainment Status for Colusa County

Pollutant	Attainment Status	
	Federal	State
Ozone	Unclassifiable/Attainment [a]	Nonattainment-Transitional
CO	Unclassifiable/Attainment [a]	Unclassified
NO_2	Unclassifiable/Attainment [a]	Attainment
SO_2	Attainment	Attainment
PM10	Unclassifiable/Attainment [a]	Nonattainment
PM2.5	Unclassifiable/Attainment [a]	Unclassified

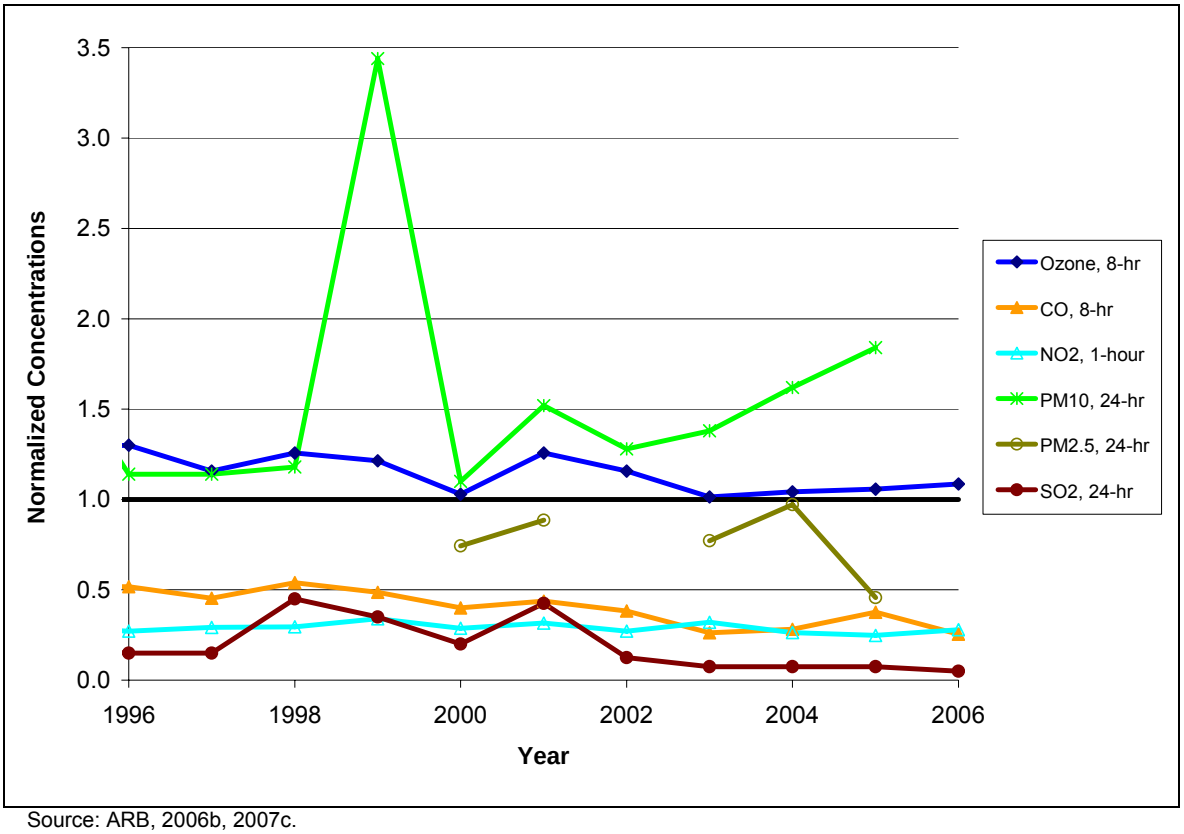
Source: ARB, 2007b; U.S. EPA, 2007b.
[a] Unclassified/Attainment – The attainment status for the subject pollutant is classified as either attainment or unclassified.

Colusa County is a rural area with agricultural operations, other area sources (such as wind-blown dust and fires), and mobile sources being the primary sources of air pollution in the county. In Colusa County, the 2005 population was estimated at 20,935 persons, and daily vehicle miles traveled (VMT) were estimated at 636,000 miles (ARB, 2006a), which represents a little less than 1 percent of the population of the SVAB and a little more than 1 percent of the VMT in the SVAB. Within the SVAB, population and VMT are projected to increase from 2005 to 2020 by 36 percent and 34 percent, respectively. This population growth within the county and air basin is forecast to result in a minor increase in the directly emitted PM10 and PM2.5 emissions from 2005 to 2020, while all other directly emitted criteria pollutant emissions are forecast to be reduced during this period.

Ambient air quality data has been collected within Colusa County at the Colusa Sunrise Boulevard Monitoring Station. This monitoring station records ozone, PM10, and PM2.5 concentrations and is located approximately 17 miles southeast of the project site. Data from monitoring sites in adjacent counties was also obtained. Monitoring sites located reasonably close to the project site include the Willows station located 12 miles north-northeast in Glenn County, a Chico station located 34 miles northeast in Butte County, and a Yuba City station located on Almond Street 38 miles east-southeast in Sutter County. Ambient air level and attainment status for each criteria pollutant are presented in the following sections.

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location, recorded at the Colusa Sunrise Boulevard station (ozone, PM10, and PM2.5), the Yuba City Almond Street station (CO and NO_2), and the Sacramento Del Paso Manor station (SO_2). In **AIR QUALITY Figure 1**, the short-term normalized concentrations are provided from 1996 to 2006. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the most stringent ambient air quality standard.

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



Source: ARB, 2006b, 2007c.

Ozone

Ozone is not directly emitted from stationary or mobile sources but is formed as the result of chemical reactions in the atmosphere between directly emitted pollutants. Nitrogen oxides (NOx) and hydrocarbons, also referred to as volatile organic compounds (VOC), interact, in the presence of sunlight, to form ozone. In addition to stationary sources, ozone can be transported from other regions into the county (ARB, 2006). Since the District is primarily rural, exceedances of the state ozone standard are generally caused by the transport of pollutants from outside of the SVAB and from the Sacramento urban area.

Under state standards, Colusa County is non-attainment-transitional for ozone, but it is designated as unclassified/attainment for ozone under the federal standard. **AIR QUALITY Table 4** presents ambient air quality data collected at the Colusa Sunrise Boulevard Station and at the Willows-East Laurel Street and Colusa Street Stations in Glenn County. The monitoring data indicates that the federal eight-hour standard has not been exceeded since 2002, the state one-hour standard has not been exceeded since 2001, and the state eight-hour standard is being exceeded no more than 2 days per year since 2004. Ozone violations occur primarily during the summer or early fall.

AIR QUALITY Table 4
Ozone Air Quality Summary, 1996–2006 (ppm)

Year	Colusa-Sunrise Blvd Station Colusa County				Willows-East Laurel St & Colusa St Stations Glenn County			
	Max. 1-hr Level	Days Above CAAQS	Max. 8-hr Level	Days Above CAAQS	Max. 1-hr Level	Days Above CAAQS	Max. 8-hr Level	Days Above CAAQS
1996	0.111	5	0.091	16	0.098	1	0.082	19
1997	0.093	0	0.081	13	0.096	1	0.081	11
1998	0.099	2	0.088	13	0.098	2	0.088	10
1999	0.095	1	0.085	15	0.101	4	0.093	26
2000	0.092	0	0.072	5	0.086	0	0.078	7
2001	0.101	5	0.088	23	0.094	0	0.085	18
2002	0.094	0	0.081	10	0.093	0	0.078	9
2003	0.089	0	0.071	1	0.090	0	0.079	8
2004	0.084	0	0.073	1	0.084	0	0.071	1
2005	0.085	0	0.074	2	0.077	0	0.071	1
2006	0.084	0	**0.076**	2	**0.086**	0	0.070	0

California Ambient Air Quality Standard: 1-hr, 0.090 ppm; 8-hr, 0.070 ppm
National Ambient Air Quality Standard: 8-hr, 0.080 ppm

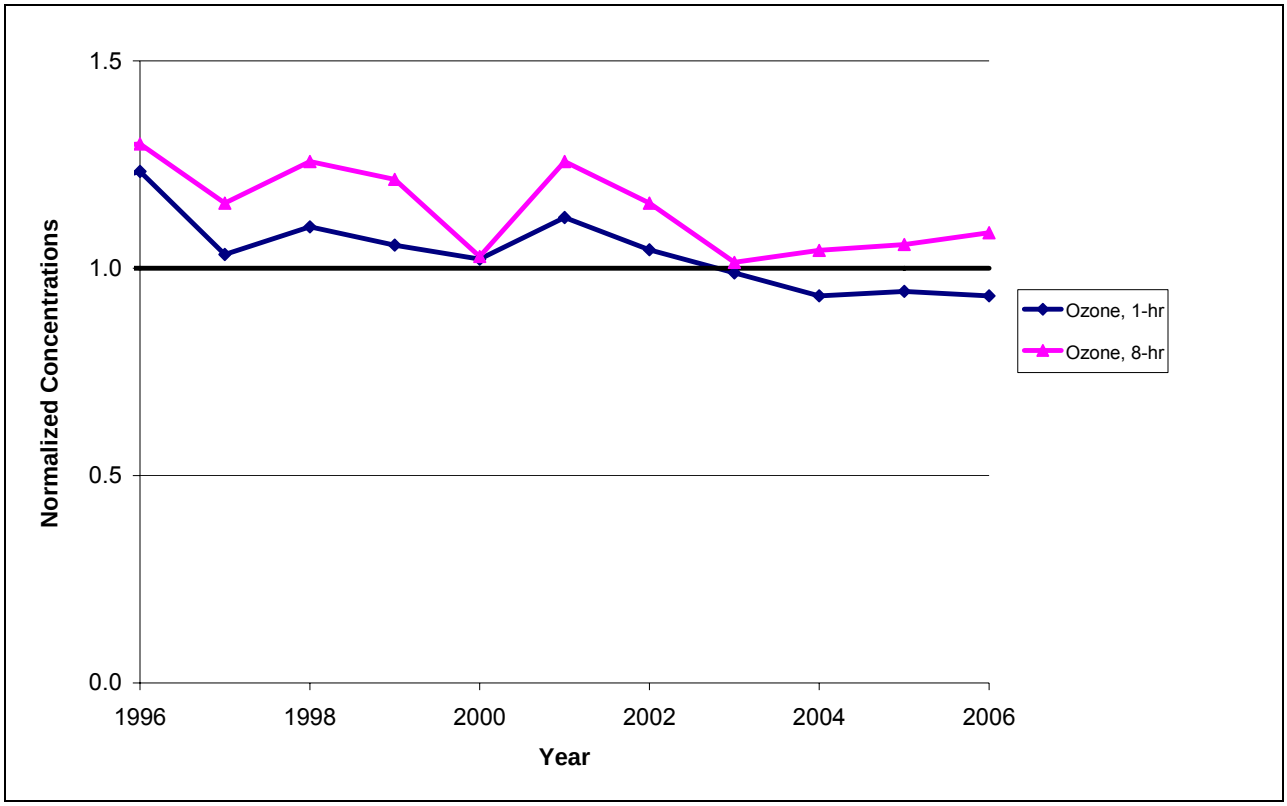
Maximum average values occurring from any of these three sites for each averaging period during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

The yearly trends from 1996 to 2006 for the maximum one-hour and eight-hour ozone concentrations, referenced to the most stringent standard, and the number of days exceeding the California one-hour standard and the federal eight-hour standard for the Colusa Sunrise Boulevard monitoring stations are shown in **AIR QUALITY Figure 2** and **Figure 3**, respectively.

As these two figures show, the one-hour and eight-hour ozone concentrations have been in gradual decline since 1996. The number of days of exceedance has also generally declined since 1996, except for 2001.

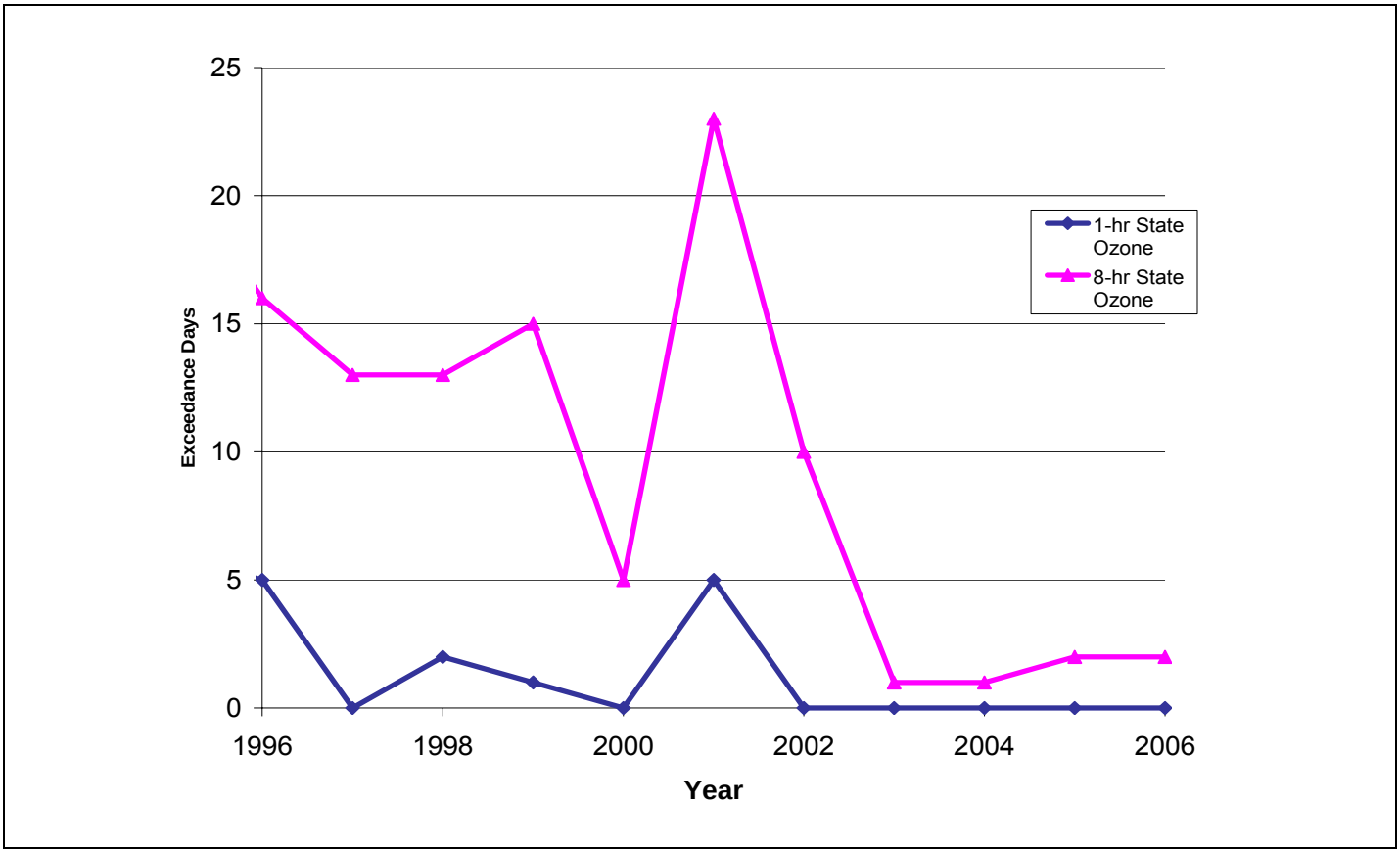
AIR QUALITY Figure 2
Normalized Ozone Air Quality Maximum Concentrations
Colusa Sunrise Boulevard (1996–2006)



Source: ARB, 2006b; ARB, 2007c.

A ”normalized concentration” is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for one-hour ozone is the state standard of 0.09 ppm, and for eight-hour ozone, the state standard of 0.070 ppm.

AIR QUALITY Figure 3
Ozone – Number of Days Exceeding the Air Quality Standards
Colusa Sunrise Boulevard (1996–2006)



Source: ARB, 2006b; ARB, 2007c.

PM10

PM10 emissions in Colusa County are generated by a variety of sources including entrained road dust, farming operations, agricultural burning, and industrial sources. Particulate matter can be emitted directly or it can be formed many miles downwind of the emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like SOx, NOx, and VOC from turbines and ammonia (NH_3) from NOx control equipment can, under the right meteorological conditions, form particulate matter including nitrates (NO_3), sulfates (SO_3), and organic solids. These pollutants are known as secondary particulates, because they are not emitted directly but are formed through complex chemical reactions in the atmosphere. Ambient PM10 standards are designed to prevent respiratory disease and protect visibility.

For the state standards, Colusa County is non-attainment for PM10. This area is designated as unclassified/attainment for the federal PM10 standard. **AIR QUALITY Table 5** presents ambient air quality data collected at the Colusa Sunrise Boulevard Station. The monitoring data indicates that the state 24-hour standard continues to be exceeded regularly. Peak PM10 concentrations recorded at this monitoring station primarily occur during the fall.

AIR QUALITY Table 5
PM10 Air Quality Summary, 1996–2005 (µg/m3)

Year	Colusa-Sunrise Boulevard Station, Colusa County			
	Days Above CAAQS	Days Above NAAQS	State Maximum Daily	State Annual Average
1996	---	0	57	---
1997	12	0	57	25.1
1998	6	0	59	20.0
1999	---	6	172	---
2000	---	0	55	---
2001	7	0	76	25.2
2002	---	0	64	---
2003	---	0	69	---
2004	---	0	84	---
2005	26	0	**92**	**25.5**

California Ambient Air Quality Standard: 24-hr, 50 µg/m^3; annual, 20 µg/m^3
National Ambient Air Quality Standard: 24-hr, 150 µg/m^3

Maximum average values occurring during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

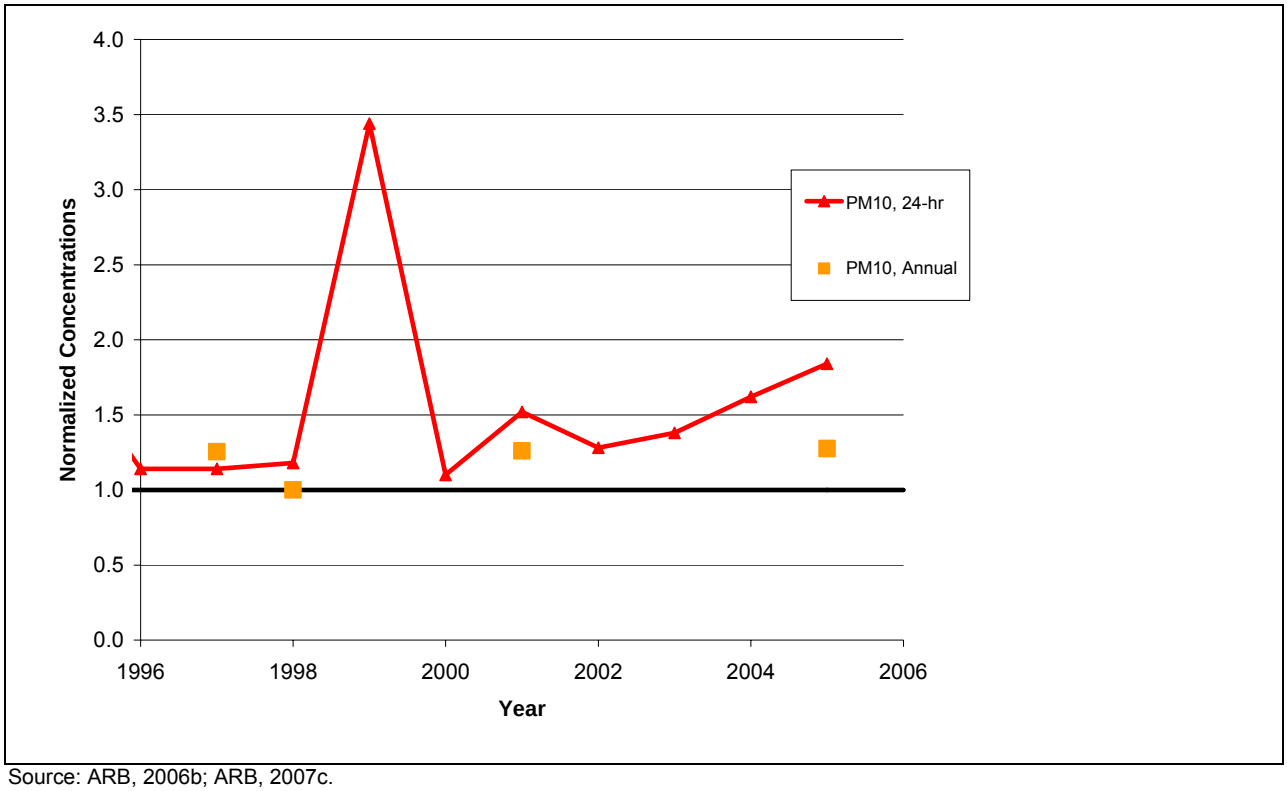
The 1996 to 2005 yearly trends for the maximum 24-hour and annual PM10 concentrations, referenced to the most stringent standard, and the number of days exceeding the California 24-hour PM10 standard for the Colusa Sunrise Boulevard monitoring stations are shown in **AIR QUALITY Figure 4** and **Figure 5**, respectively.

While Colusa County is in attainment of the federal PM10 standards, as the two figures show, there has been little or no progress since 1996 in attaining the California PM10 standards. However, the available monitoring data has a considerable number of data gaps, so trends cannot be reliably determined for the 1996 to 2005 period of monitoring.

PM2.5

The highest measured PM2.5 concentrations typically occur in the winter or late fall. During winter, high PM2.5 episodes—the contribution of ground level releases to ambient PM2.5 concentrations—can be disproportionately high due to stable low level inversion layers, the same phenomena that helps create Tule fog events. The contribution of wood-smoke particles to the PM2.5 concentrations during these wintertime inversions may be significant considering that most of the wood-smoke particles are smaller than 2.5 microns. PM2.5 is both emitted directly, primarily from mobile and stationary combustion sources, and produced from secondary particulate formation.

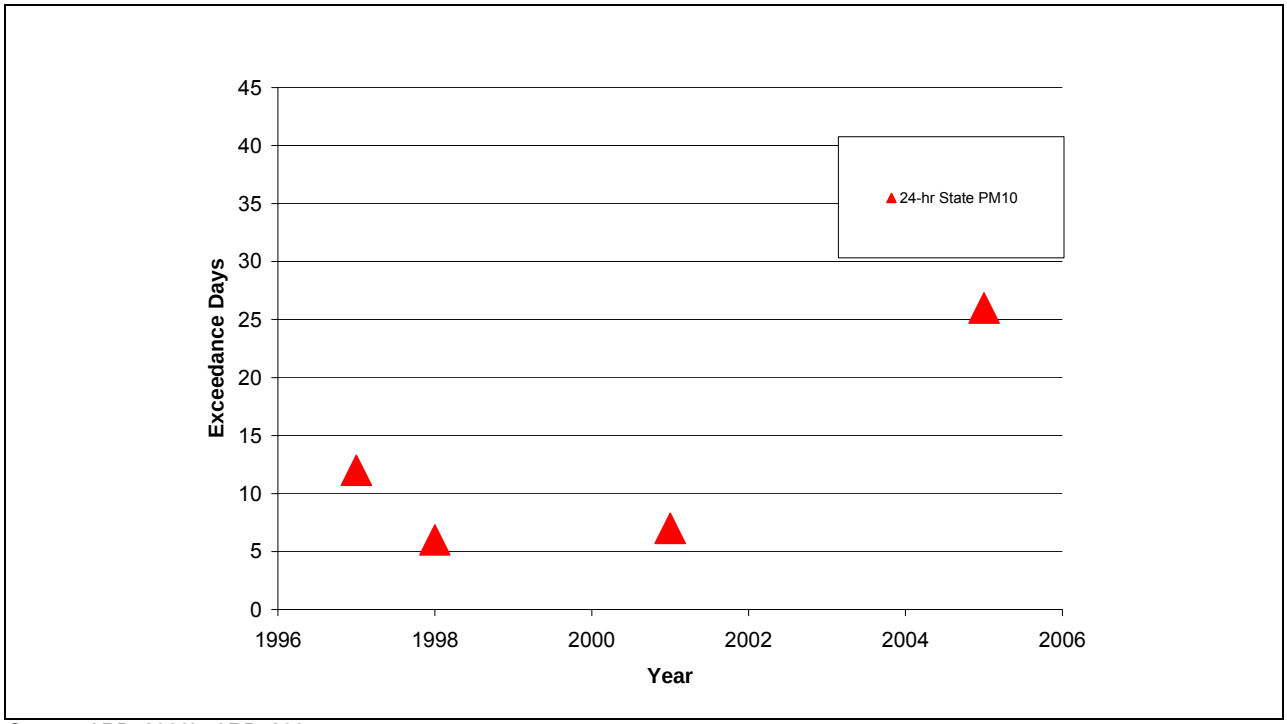
AIR QUALITY Figure 4
Normalized PM10 Air Quality Maximum Concentrations
Colusa Sunrise Boulevard (1996–2005)



Source: ARB, 2006b; ARB, 2007c.

A "normalized concentration" is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for 24-hour PM10 is the state standard of 50 $\mu g/m^3$; for the Annual Arithmetic Mean, the state standard of 20 $\mu g/m^3$; for 24-hour PM2.5, the federal standard of 35 $\mu g/m^3$; and for the National Annual Arithmetic Mean PM2.5, the federal standard of 15 $\mu g/m^3$.

AIR QUALITY Figure 5
PM10 — Number of Days Exceeding the 24-Hour Air Quality Standard
Colusa Sunrise Boulevard (1996–2005)



Source: ARB, 2006b; ARB, 2007c.

Colusa County is designated as unclassified and unclassifiable/attainment for the state and federal PM2.5 standards, respectively. **AIR QUALITY Table 6** presents ambient air quality data collected at the Colusa Sunrise Boulevard Station.

AIR QUALITY Table 6
PM2.5 Air Quality Summary, 1999–2006 (μg/m^3)

Year	Colusa Sunrise Boulevard Station				
	National Maximum Daily	98th Percentile Maximum Daily	3-Yr National 98th Percentile Maximum Average	State Annual Average	Federal Annual Average
1999	55	---	---	---	---
2000	28	26	---	---	8.0
2001	36	31	---	9.6	9.6
2002	57	---	---	---	---
2003	30	27	---	---	8.0
2004	38	34	---	7.3	7.3
2005	34	16	26	**11.2**	7.0
2006	50	30	**27**	7.9	7.9

California Ambient Air Quality Standard: annual, 12 μg/m^3
National Ambient Air Quality Standard: 24-hr, 35 μg/m^3; annual, 15 μg/m^3

Maximum average values occurring during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

Carbon Monoxide

For the carbon monoxide (CO), Colusa County is designated as unclassified/attainment under both state and federal standards. **AIR QUALITY Table 7** presents CO data collected at the Chico and Yuba City monitoring sites. No violations of the standards have occurred in recent years.

AIR QUALITY Table 7
Carbon Monoxide Air Quality Summary, 1996–2006 (ppm)

Year	Chico-Manzanita Avenue Station, Butte County		Yuba City-Almond Street Station Sutter County	
	Maximum 1-hr Average	Maximum 8-hr Average	Maximum 1-hr Average	Maximum 8-hr Average
1996	5.3	3.4	7.7	4.7
1997	6.8	3.8	6.1	4.1
1998	6.0	4.5	7.3	4.9
1999	7.2	5.4	7.2	4.4
2000	5.2	4.0	6.1	3.6
2001	6.4	4.3	17.2	3.9
2002	5.1	3.5	6.4	3.5
2003	3.9	2.5	4.3	2.4
2004	3.6	2.9	**5.8**	2.5
2005	3.3	2.7	4.4	**3.4**
2006	---	2.7	---	2.3

California Ambient Air Quality Standard: 1-hr, 20 ppm; 8-hr, 9 ppm
National Ambient Air Quality Standard: 1-hr, 35 ppm; 8-hr, 9 ppm

Maximum average values occurring from either of these two sites for each averaging period during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

Nitrogen Dioxide

For both the state and federal nitrogen dioxide (NO_2) standards, Colusa County is designated as attainment or unclassifiable. **AIR QUALITY Table 8** presents NOx data collected at the Chico and Yuba City monitoring sites. No violations of the NO_2 ambient air quality standards have occurred in recent years.

AIR QUALITY Table 8
Nitrogen Dioxide Air Quality Summary, 1996–2006 (ppm)

Year	Chico-Manzanita Avenue Station, Butte County		Yuba City-Almond Street Station, Sutter County	
	Maximum 1-hr Average	Maximum Annual Average	Maximum 1-hr Average	Maximum Annual Average
1996	0.070	0.013	0.068	0.012
1997	0.061	0.013	0.073	0.014
1998	0.068	0.013	0.074	0.013
1999	0.077	0.015	0.085	0.014
2000	0.078	0.012	0.072	0.013
2001	0.062	0.012	0.079	0.014
2002	0.058	0.012	0.068	0.015
2003	0.057	0.011	0.080	0.014
2004	0.056	0.011	0.066	0.012
2005	0.048	0.009	0.062	0.012
2006	0.046	0.009	**0.070**	**0.012**

California Ambient Air Quality Standard: 1-hr, 0.25 ppm
National Annual Ambient Air Quality Standard: annual 0.053 ppm

Maximum average values occurring from either of these two sites for each averaging period during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

Sulfur Dioxide

For both the state and federal sulfur dioxide (SO_2) standards, Colusa County is designated as attainment. **AIR QUALITY Table 9** presents SO_2 data collected at the two closest monitoring sites, the North Highlands and Del Paso Manor Stations located in Sacramento County. No violations of the standards have occurred in recent years.

AIR QUALITY Table 9
Sulfur Dioxide Air Quality Summary, 1996–2006 (ppm)

Year	North Highlands Station Sacramento County			Del Paso Manor Station Sacramento County		
	Maximum 1-hr Average	Maximum 24-hr Average	Annual Average	Maximum 1-hr Average	Maximum 24-hr Average	Annual Average
1996	0.014	0.003	0.001	0.013	0.006	0.002
1997	0.038	0.004	0.001	0.015	0.006	0.002
1998	0.013	0.005	0.001	0.029	0.018	0.003
1999	0.014	0.004	0.001	0.026	0.014	0.004
2000	0.013	0.005	0.001	0.023	0.008	0.005
2001	0.014	0.011	0.001	0.031	0.017	0.002
2002	0.017	0.009	0.002	0.013	0.005	0.001
2003	0.012	0.006	0.001	0.013	0.003	0.001
2004	0.008	0.002	0.001	0.008	0.003	0.001
2005	0.010	0.002	0.001	**0.018**	0.003	0.001
2006	---	**0.003**	**0.001**	---	0.002	0.001

California Hourly Ambient Air Quality Standard: 1-hr, 0.250 ppm
California Ambient Air Quality Standard: 24-hr, 0.040 ppm
National Annual Ambient Air Quality Standard: annual, 0.030 ppm

Maximum average values occurring from either of these two sites for each averaging period during the most recent three years of available data are indicated in bold.

Source: ARB Air Quality Data; ARB, 2006b; ARB, 2007c.

Summary

In summary, staff recommends the background ambient air concentrations in **AIR QUALITY Table 10** for use in the modeling and impacts analysis. The maximum criteria pollutant concentrations from the past three years (2004–2006) collected at the monitoring stations within Colusa County or otherwise nearest to and most representative of the site are used to determine the recommended background values.

AIR QUALITY Table 10
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	131.6	470	28
	Annual	22.6	100	23
CO	1 hour	6,670.0	23,000	29
	8 hour	3,778.0	10,000	38
PM10	24 hour	92.0	50	184
	Annual	25.5	20	128
PM2.5	24 hour	27.0	35	74
	Annual	11.2	12	93
SO_2 [a]	1 hour	47.2	655	7
	3 hour	42.5	1300	3
	24 hour	7.9	105	8
	Annual	2.7	80	3

Source: ARB, 2006b; ARB, 2007c; and Energy Commission Staff Analysis
[a] The 3-hour background SO_2 concentration is assumed to be 90% of the 1-hour background.

For ozone and PM10, the highest monitored values from the Colusa and Willows monitoring stations were used to determine the background concentrations. For CO and NO_2, the highest values from the Chico and Yuba City monitoring stations were used to determine the background concentrations. For SO_2, the highest values from the Sacramento County monitoring stations were used to determine the background concentrations.

PROJECT DESCRIPTION AND EMISSIONS

The proposed CGS is a nominal 660-megawatt (MW) natural gas-fired, combined cycle electric generating facility. The proposed major air emissions sources are (E&LW, 2006a):

- Two GE 7FA natural gas-fired combustion turbine generators (CTGs) with dry, low NOx combustors and inlet air evaporative coolers;
- Two heat recovery steam generators (HRSGs) each equipped with 688-MMBtu/hr duct burners;
- One diesel-fueled 1,340-horsepower emergency generator engine;
- One diesel-fueled 300-horsepower fire water pump; and
- One natural gas-fired auxiliary boiler with 44-MMBtu/hr heat input.

CONSTRUCTION

Project Site

The site is approximately 100 acres with the CGS occupying approximately 31 acres. The applicant has estimated that a total of 97 acres will be disturbed during construction. Construction at the CGS project site is expected to occur over a period of 24 months, with off-site construction starting one month before project site construction. The CGS construction will consist of laydown and construction of the power plant buildings and switchyard. This includes the following major structures (E&LW, 2006a):

- Two CTGs and one steam turbine generator,
- Two HRSGs and stacks,
- Air-cooled condenser,
- Aqueous ammonia storage tank and piping,
- Fin-fanned cooler,
- Administration and control building,
- Water treatment building,
- Main transformer, suspension pole, and lattice tower,
- Two water storage tanks,
- Zero liquid discharge (ZLD) wastewater treatment system,
- Storm water collection system including a 2.5-acre detention basin,

- Auxiliary boiler and steam lines.

Linear and Off-Site Improvements

The CGS will construct the following linear and off-site improvements (E&LW, 2006a):

- Asphalt paved roadway approximately 2,700 feet in length and 30 feet in width,
- Twelve new transmission lattice towers, four on-site and eight off-site,
- Natural gas pipeline from the adjacent PG&E natural gas main, approximately 1,500 feet of 8-inch pipe,
- Water supply pipeline from the nearby Tehama-Colusa Canal, approximately 2,700 feet of 4-inch pipe,
- Widening of the Delevan and McDermott Roads intersection,
- Reconstruction of the existing Teresa Creek Bridge,
- Glenn-Colusa Canal Bridge Replacement,
- Tehama-Colusa Canal Access Road.

Construction Emissions

Construction activities are based on 22 days per month and a 10-hour workday. The construction of facilities will generate air emissions, primarily fugitive dust from earth moving activities and combustion emissions generated from the construction equipment and vehicles. The projected highest daily emissions, based on the highest monthly emissions over the 24 month construction activity, are shown in **AIR QUALITY Table 11**. The peak short-term emissions, particularly the peak PM10 and PM2.5 emissions, will occur for site grading and construction laydown activities, which are scheduled during months two through four of project construction.

AIR QUALITY Table 11
CGS Project Construction Emissions

Pollutant	Worst-Case Hour (lb/hr)	Worst-Case Month (lb/month)	Worst-Case Annual (tons/yr)
NOx	33.40	6,677.9	33.58
CO	17.10	3,420.1	17.68
VOC	5.40	1,071.3	5.53
SOx	0.03	6.0	0.03
Exhaust PM10	1.60	328.8	2.19
Fugitive PM10	15.30	3,056.6	7.27
Exhaust PM2.5	1.60	328.8	2.19
Fugitive PM2.5	3.20	635.8	1.51

Source: URS, 2007g, DR 36 (revised).
Based on 10-hour day where the exhaust PM values correspond to the peak fugitive dust period and the fugitive dust PM2.5 was calculated using a PM2.5 to PM10 factor of 0.208 for construction.

The applicant used off-road and on-road equipment emission factors from the South Coast Air Quality Management District (SCAQMD) and the California Environmental Quality Act (CEQA) Web site (SCAQMD, 2007), that use emission factors based on the ARB's OFFROAD and EMFAC emission factor models, respectively. The on-road emission estimate, which was not provided in a manner that allows it to be added to the hourly, daily, and annual on-site emissions, is provided in Appendix G2-A of the Application for Certification (AFC) (E&LW, 2006a).

For fugitive dust emission calculation, the applicant utilized an uncontrolled emission factor of 0.11 tons of PM10 per month per acre, assuming a 90 percent control efficiency resulting from on-site mitigation measures, to estimate the fugitive dust emissions from the acres disturbed during construction. The applicant also calculated fugitive dust emissions from specific on-site dirt pushing activities and unpaved on-site travel using U.S. EPA emission factor calculations (U.S. EPA, 2007c).

INITIAL COMMISSIONING

Initial commissioning refers to the time period between completion of the construction and reliable production of electricity for sale on the market. For most power plants, operating emission limits usually do not apply during the initial commissioning procedures. During the initial testing phases of initial commissioning, the post-combustion controls systems such as selective catalytic reduction (SCR) and oxidation catalysts are generally not operational.

The applicant has identified 15 phases for the initial commissioning which will occur over several months, with an estimated 910 hours of active operation per combustion turbine (CT). The initial commissioning phases identified are as follows:

1. First fire – 4 hours (all hours are per CT).
2. Green rotor run-in – 12 hours
3. Steam blows – 168 hours
4. Restoration – no turbine operation
5. Turbine roll/overspeed – 16 hours
6. Part load dry, low NOx tuning – 30 hours
7. Outage/water wash – no turbine operation
8. Fine Dry Low NOx combustor tuning/finalize control constants – 160 hours
9. Duct burners and safety valves – 144 hours
10. Outage (strainers/SCR catalyst, etc.) – no turbine operation
11. Continuous emission monitors drift and source testing – 64 hours
12. Functional tests – 96 hours
13. Outage/water wash – no turbine operation
14. Performance test – 24 hours
15. Continuous operation test – 192 hours

Some of these initial commissioning phases have periods at different operating load levels and periods with and without duct burner operation.

The worst-case emissions resulting from initial commissioning activities are pollutant specific. The maximum NOx emissions during initial commissioning are assumed to occur during 50 percent load operation during several of the commissioning phases before the installation of the SCR, and the maximum CO and VOC emissions are assumed to occur during first fire and steam blow phases in which the turbine is held at 25 percent load. The PM10 and SO_2 emission estimates during initial commissioning are based on fuel input and are not estimated to be higher than normal operating emissions. The short-term, worst-case, and entire initial commissioning period emissions estimated for each pollutant are presented in **AIR QUALITY Table 12**.

AIR QUALITY Table 12
Emissions from Initial Commissioning Activities

Pollutant	Turbine Load for Peak Emissions	Peak Emission Rate (lb/hr) [a]	Total Emissions for Commissioning (tons) [b]
NOx	50%	475.0	97.0
CO	25%	1,287.3	303.6
VOC	25%	47.1	13.1
SO_2	100% w/DB	7.4	0.6
PM10	100% w/DB	18.0	13.8

Source: L&W, 2007b, Data Response 30.
Peak hourly SO_2 corrected to 1.0 grain/100 standard cubic feet (SCF) natural gas sulfur content, and total corrected to 0.3 grain/100 SCF with duct burners (DB) operating.
[a] Emissions per turbine/HRSG.
[b] Emissions for both turbines/HRSGs.

OPERATIONAL PHASE

Operational Emission Controls and Monitoring

NOx Controls

A SCR emission control system including catalyst and ammonia injection system is proposed for installation on the two HRSGs. In addition, the CTGs will be equipped with a Dry Low NOx Combustion System (DLN).The combined DLN and SCR systems will limit exhaust concentrations of NOx, which will be reduced to 2.0 parts per mission by volume, dry (ppmvd) at 15 percent O_2. Stack emissions of ammonia from the SCR system (ammonia slip) will be limited to 5 ppmvd at 15 percent O_2.

The auxiliary boiler will be limited to 15 ppmvd NOx at 15 percent O_2. The applicant has not finalized the control technology selection for the auxiliary boiler (URS, 2007g, DR 26); however, staff expects that the use of a low NOx burner will be proposed to meet the 15 ppm NOx limit.

The emergency generator engine and the firewater pump engine will meet the latest U.S.EPA/ARB diesel engine standards, which for the 1340-horsepower emergency generator engine would be Tier 2 emission standards and for the 300-horsepower fire pump engine would be Tier 3 emission standards. For the emergency generator engine, the proposed emission controls include direct diesel injection, turbocharger, charge air cooler, and an engine control module (L&W, 2007b, DR 27). The specific emission controls for the firewater pump Tier 3 engine are not yet available (URS, 2007g, DR 28). The applicable Tier 2 and Tier 3 emission standard limits are as shown in the following **AIR QUALITY Table 13**.

AIR QUALITY TABLE 13
Tier 2 and Tier 3 Emission Standard Limits

Pollutant	Emergency Generator Engine Tier 2 Standards	Firewater Pump Engine Tier 3 Standards
NOx+NMHC	4.8 g/bhp	3.0 g/bhp
CO	2.6 g/bhp	2.6 g/bhp
PM	0.15 g/bhp	0.15 g/bhp

NMHC = Non-methane hydrocarbons
g/bhp = grams/break horsepower

CO and VOC Controls

Installation of an oxidation catalyst is proposed for the two HRSGs to limit CO emissions to 3 ppmvd and VOC emissions to 2 ppmvd at 15 percent O_2.

As noted above, the auxiliary boiler will meet specific emission limits. In the case of CO and VOC emissions, these limits are 50 and 10 ppmvd, respectively, at 15 percent O_2.

As also noted above, the two diesel engines will meet appropriate EPA/ARB Tier standards, which will also control CO and VOC emissions.

PM and SO_2 Controls

The exclusive use of pipeline-quality natural gas, a relatively clean-burning fuel, will limit the formation of PM and SO_2 emissions from the turbine/HRSGs and auxiliary boiler. Natural gas contains very little non-combustible gas or solid residues and a small amount of reduced sulfur compounds including mercaptan, thus resulting in relatively low emissions of the above-mentioned pollutants. It is assumed for emission calculations purposes that the short-term maximum natural gas sulfur content is 1.0 grains/100 SCF, while the long-term or annual average sulfur content is 0.3 grains/100 SCF. This is a revision from the 0.2 grains/100 SCF used by the applicant in the AFC.

As noted above, the two diesel engines will meet appropriate EPA/ARB Tier standards, which will also control PM emissions. Additionally, the exclusive use of ultra-low sulfur (15 ppm by weight) diesel fuel will control the SO_2 emissions from the two engines.

Emission Monitoring

Installation of continuous emission monitors (CEMs) is proposed to measure NOx, CO, and O_2 emissions to assure adherence with the proposed turbine/HRSG emission limits. The proposed CEM system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the plant's control room when the level of emissions approaches or exceeds pre-selected limits.

Project Operating Emissions

Operating major equipment components at CGS will generate air emissions. The emissions will vary depending on the activity being conducted. The operational activities of CGS include startup of the power plant and nominal and maximum operation of the power plant. The estimated emissions from each activity are discussed below.

Startup/Shutdown

Startup and shutdown events typically have higher NOx, CO, and VOC emission rates than full load operations. The expected emission rates during startup and the required time for each activity are summarized in **AIR QUALITY Table 14**. Emissions of SOx and PM10 are a function of the quantity of fuel burned. Since fuel consumption will be less during start-up and shutdown that at full load duct firing operation, emissions of these pollutants are equal to or less than the emission rates shown for normal operations in **AIR QUALITY Table 15**.

AIR QUALITY Table 14
Startup and Shutdown Emission Estimates

Startup/Shutdown Type	Timeframe	NOx	CO	VOC	SO_2[a]	PM10
Cold Startup (270 min)	lb/hr/CT	333.3	373.6	27.7	1.80	12.0
	lb/event/CT	779.1	1,355.6	106.7	4.56	48.8
Warm Startup (180 min)	lb/hr/CT	152.0	370.3	27.7	1.80	12.0
	lb/event/CT	456.2	790.5	47.4	2.61	30.8
Hot Startup (90 min)	lb/hr/CT	249.9	429.6	27.7	1.80	12.0
	lb/event/CT	259.9	679.6	38.0	1.50	12.8
Shutdown (30 min)	lb/hr/CT	115.0	483.5	23.9	0.90	6.0
	lb/event/CT	115.0	483.5	23.9	0.90	6.0

Source: E&LW, 2006a, Appendix G3, Attachment 1.
[a] SO_2 emissions from the applicant's reference were based on a natural gas sulfur content of 0.2 grains/100 SCF, which was adjusted to 1.0 grains/100 SCF.

Normal Operating Emissions

Operating emissions from two gas turbine/HRSGs were estimated using base case emission rates and emissions from startup and shutdown. The base case emission rates combined for both of the gas turbine/HRSGs, determined for three specific ambient conditions and including the bounding cold and hot ambient cases, are provided in **AIR QUALITY Table 15**.

AIR QUALITY Table 15
Normal Hourly Emissions for the CGS Turbines/HRSGs

Operating Load and Temperature	Two Turbine/HRSG Pollutant Emission Rates (lb/hr)					
	NOx	CO	VOC	SOx[a]	PM10	NH_3
50% Load, 18°F	19.4	17.8	4.4	7.1	25.2	18.0
50% Load, 59°F	18.2	16.6	4.2	6.6	25.0	16.8
50% Load, 114°F	17.2	15.6	4.2	6.3	25.0	15.8
75% Load, 18°F	24.6	22.6	5.4	8.9	25.4	22.8
75% Load, 59°F	23.0	21.0	5.0	8.3	25.4	21.2
75% Load, 114°F	22.0	20.0	5.0	7.9	25.2	20.4
100% Load, 18°F (no DB) [b]	30.6	28.0	6.8	11.0	25.8	28.4
100% Load, 59°F (no DB) [b]	28.4	26.0	6.2	10.2	25.6	26.2
100% Load, 114°F (no DB) [b]	27.0	24.6	6.0	9.7	25.6	25.0
100% Load, 18°F (w/DB) [b]	41.4	37.8	14.4	14.8	40.0	38.4
100% Load, 59°F (w/DB) [b]	39.2	35.8	13.6	14.0	39.8	36.4
100% Load, 114°F (w/DB) [b]	38.0	34.8	13.2	13.6	40.2	35.2

Source: E&LW, 2006a, Appendix G3, Attachment 1.
[a] SOx emissions have been revised based on fuel rates provided in E&LW, 2006a, Appendix G3, Attachment 1 to incorporate a correction considered necessary by staff to correctly represent the worst-case, short-term fuel sulfur content assumption of 1.0 grains per 100 SCF.
[b] w/DB – with duct burners firing, no DB – without duct burners firing.

The applicant's quarterly and annual emission calculations are based on operating profile assumptions for each quarter. The applicant has assumed a different operating profile for the third quarter (six days a week of operation for 16 hours per day with duct firing) than for the other three quarters, where nearly continuous operation with daily peak period duct firing is assumed. Quarterly and annual operating emissions were then estimated based on these specific operating assumptions. **AIR QUALITY Table 16** presents the expected turbine operating conditions for each quarter. The base case includes expected variation in plant operating load and duct burner operations during each quarter. Duct burners were assumed to be operating only at full load.

AIR QUALITY Table 16
Assumptions for Quarterly and Annual Operating Conditions

Condition	1st Quarter	2nd Quarter	3rd Quarter		4th Quarter
Pollutant Basis	All	All	NOx/CO/VOC	SOx/PM	All
Number of Hot Starts	10.5	10.5	60.7	10.5	11.5
Hot Start Duration (hr)	1.5	1.5	1.5	1.5	1.5
Number of Warm Starts	0.0	0.0	12.0	0.0	0.0
Warm Start Duration (hr)	3.0	3.0	3.0	3.0	3.0
Number of Cold Starts [a]	3.5	3.5	1.0	3.5	3.5
Cold Start Duration (hr)	4.5	4.5	4.5	4.5	4.5
Shutdowns Operations (hr)	14.0	14.0	73.7	14.0	15.0
Shutdown Duration	0.5	0.5	0.5	0.5	0.5
Total Startup/Shutdown (hr)	38.5	38.5	168.4	38.5	40.5
Turbine Off (hr)	0.0	0.0	1000.0	0.0	0.0
Operations without Duct Burners (hr)	1,082.0	1,106.0	0.0	1,130.0	1,128.0
Operations with Duct Burners (hr)	1,040.0	1,040.0	1,040.0	1,040.0	1,040.0
Total Hours in Quarter (hr)	2,160.0	2,184.0	2,208.0	2,208.0	2,208.0

Source: E&LW, 2006a, Appendix G3, Attachment 1; URS, 2007g, DR 12 and 13.

The expected quarterly emissions resulting from the quarterly base case operating assumption shown above are presented in **AIR QUALITY Table 17**. The emissions, based on expected operating loads and duct burner operations were estimated for each quarter. These emissions represent requested maximum quarterly emissions.

AIR QUALITY Table 17
Criteria Pollutant Quarterly and Annual Emissions for Both Turbines

Period	Units	NOx	CO	VOC	SOx[a]	PM10
1st Quarter	(ton/qtr)	45.1	53.4	12.3	4.1	35.1
2nd Quarter	(ton/qtr)	43.1	51.6	11.6	3.8	35.2
3rd Quarter	(ton/qtr)	50.9	106.3	11.8	3.8	35.5
4th Quarter	(ton/qtr)	43.8	53.1	11.7	3.8	35.5
Annual	(ton/yr)	183.0	264.5	47.4	15.5	141.5

Source: E&LW, 2006a, Appendix G3, Attachment 1; URS, 2007g, DR 12 and 13.
[a] The applicant's SOx calculations appear to be too high, due to what appears to be an inappropriate use of the conversion of lower to higher heating content. Staff has corrected the SOx calculations here and in all other gas turbine/HRSG emission tables as appropriate.

Maximum Expected Emissions

Maximum operating emissions from the turbines are based on short-term, worst-case emissions from both turbines. The worst-case operating conditions for each criteria

pollutant are pollutant specific. PM10 and SOx emissions are directly proportional to fuel usage; therefore, worst case emissions are at 100 percent load with duct burners operating. For other pollutants, the worst-case operating condition is during startups or shutdown. The worst-case scenario for each pollutant is given in **AIR QUALITY Table 18**. Maximum operating emissions from the turbines as modeled for impact analysis purposes are presented in **AIR QUALITY Table 19**.

AIR QUALITY Table 18
Worst Case Operating Conditions for Each Criteria Pollutant

1-Hour Emissions	NOx, CO	Cold startup
	CO	Shutdown
	VOC	Startup – any kind
	PM10, SO_2	100% load with duct burners operating at 114°F and 18°F
3-Hour Emissions	SO_2	100% load with duct burners operating at 18°F
8-Hour Emissions	CO	6 hours of startup and shutdown with the balance at 100% load with duct burners operating at 18°F
24-Hour Emissions	NOx, CO, VOC	6 hours of startup and shutdown with the balance at 100% load with duct burners operating at 18°F
	PM10, SO_2	100% load with duct burners operating at 114°F and 18°F

Source: L&W, 2007b, DR 19.

AIR QUALITY Table 19
Worst-Case Short-Term Emissions for Both Turbines

	Units	NOx	CO	VOC	SOx	PM10
1-Hour	(lb/hr)	666.6	967.0	55.4	14.8	40.2
3-Hour	(lb/3 hrs)	--	--	--	44.4	--
8-Hour	(lb/8 hrs)	--	7,054.2	--	--	--
24-Hour	(lb/day)	2,994.6	7,659.0	630.6	355.2	964.8

Source: L&W, 2007b, DR 18.

Auxiliary Equipment Emissions

CGS has an auxiliary boiler, an emergency generator engine, and an emergency firewater pump engine. The auxiliary boiler is used to maintain turbine seals and provide steam to the air cooled condenser steam jet air injectors during shutdown, facilitate startup, and include capacity to operate the zero liquid discharge system. The requested maximum hours of operation for the auxiliary boiler are 3,744 hours per year. The non-emergency operation of the emergency generator and firewater pump will be limited to 50 hours of testing per year. Emissions from the auxiliary equipment are presented in **AIR QUALITY Table 20**.

AIR QUALITY Table 20
Annual Emissions from Auxiliary Equipment

	NOx		CO		VOC		SOx		PM10	
Equipment	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**	**(lb/hr)**	**(ton/yr)**
Auxiliary Boiler	0.79	1.48	1.61	3.01	0.18	0.10	0.13	0.07	0.33	0.62
Emergency Gen.	13.90	0.35	0.32	0.008	0.15	0.004	0.01	0.003	0.09	0.002
Firewater Pump	1.98	0.05	0.22	0.006	a	A	<0.01	0.003	0.08	0.002

Source: L&W, 2007b, DR 18; URS, 2007g, DR 26 and 28.
a – Included in Tier 3 NOx emission limit, which is specified as non-methane hydrocarbons (NMHC) + NOx.

Total Facility Emissions

The total quarterly and annual emission levels for both gas turbine/HRSGs and auxiliary equipment are provided in **AIR QUALITY Table 21**. Actual operating conditions at the CGS will vary, but will not exceed these quarterly and annual emission levels.

AIR QUALITY Table 21
Criteria Pollutant Quarterly and Annual Emissions for CGS

Period	Units	NOx	CO	VOC	SOx	PM10
1st Quarter	(ton/qtr)	45.60	54.20	12.36	4.05	35.29
2nd Quarter	(ton/qtr)	43.62	52.40	11.69	3.83	35.39
3rd Quarter	(ton/qtr)	51.34	107.06	11.90	3.87	35.70
4th Quarter	(ton/qtr)	44.31	53.86	11.82	3.87	35.69
Annual	(ton/yr)	184.87	267.52	47.77	15.62	142.08

Source: E&LW, 2006a, Appendix G3, Attachment 1; L&W, 2007b, DR 18; URS, 2007g, DR 12 and 13 and 26 and 28.

Ammonia Emissions

The applicant has stated that ammonia emissions resulting from operation of the SCR shall be limited to 5 ppmvd at 15 percent O_2. The applicant has estimated that the maximum ammonia slip emissions for both turbines will be 38.4 pounds/hour and 159 tons/year (E&LW, 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses three kinds of impacts: construction, operation, and cumulative effects. As the name implies, construction impacts result from the emissions that occur during construction of the project. The operation impacts result from the operating emissions of the proposed project over the proposed lifetime of the project. Cumulative effects analysis assesses the impacts that result from the proposed project's incremental effect together with other closely related past and present projects and those in the reasonably foreseeable future, whose impacts may compound or increase the incremental effect of the proposed project. Additionally, cumulative impacts are assessed in terms of conformance with the District's attainment or maintenance plans.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff used two main significance criteria in evaluating this project. First, all project emissions of non-attainment criteria pollutants and their precursors (NOx, VOC, PM10, and SO_2) are considered significant and must be mitigated. Second, any ambient air quality standard (AAQS) violation or any contribution to any AAQS violation caused by any project emissions is considered to be significant and must be mitigated. For construction emissions, the mitigation that is considered is limited to controlling both construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, the mitigation includes both feasible emission controls (BACT) and the use of emission reduction credits to offset emissions of non-attainment criteria pollutants and their precursors.

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the project that reach the ground level. When emissions are expelled at a high temperature and velocity through the relatively tall stack, the pollutants will be significantly diluted by the time they reach ground level. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum off-site pollutant concentrations for short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, which in turn are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant has used EPA-approved screening (SCREEN3) and refined models (AERMOD) to estimate the direct impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project construction and operation. Additional modeling of the regional haze and other air quality related value impacts to the nearest federal designated Class I area Yolla Bolly-Middle Eel Wilderness Area was completed using the CALPUFF model. A description of the modeling analysis methods are provided in Sections 8.1.2.3 through 8.1.3 and Appendix G1 of the AFC (E&LW, 2006a). The modeling output results were added to representative pollutant background data from area monitoring stations that are shown previously in **AIR QUALITY Table 10**. The results were then compared with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions); specific turbine emission data; and meteorological data, such as wind speed, atmospheric conditions, and site elevation. This project included five years (2001 to 2005) of surface meteorological data from Maxwell, which is the closest complete representative surface meteorological data source to the project site (E&LW, 2006a, p. 8.1-8). The upper air data used in AERMOD is from Oakland. The meteorological data were approved for use by the CCAPCD and U.S. EPA.

Construction Impacts and Mitigation

The following section discusses the project's short-term direct construction ambient air quality impacts, as estimated by the applicant, and provides a discussion of appropriate mitigation. Staff reviewed the construction emissions estimates and air dispersions modeling procedures and considers them to be adequate for impact determination and generally conservative for this siting case.

Construction Impact Analysis

The applicant modeled the emissions of the CGS on-site construction using the AERMOD model. The fugitive dust emissions were modeled as two large area sources that covered the total active area of the construction site. The exhaust emissions were modeled as two large volume sources. Overall, the methodology used by the applicant is overly simplified and does not take advantage of less conservative modeling input methods. Therefore, the modeling method used by the applicant should overestimate impacts, particularly the fugitive dust impacts, based on the construction emission quantities modeled.

For the determination of one-hour average construction NOx concentrations, the applicant used the Ozone Limiting Method (OLM) option of the AERMOD model. This option assumes that 10 percent of the NOx is NO_2, and adds the conversion of NO to NO_2 based on the background ozone concentration for each hour modeled.

To determine the construction impacts, the worst-case daily on-site construction emission levels shown in **AIR QUALITY Table 11** were used. Modeling assumed that all of the equipment would operate from 7 a.m. to 5 p.m. daily (L&W, 2007b, DR 21). **AIR QUALITY Table 22** provides the results of this modeling analysis.

As can be seen from the modeling results provided in **AIR QUALITY Table 22**, the construction impacts of PM10 and PM2.5 (24-hour and annual) exceed the ambient air quality standards and are, therefore, potentially significant. The applicant's construction modeling analysis indicates that the maximum NOx, CO, and SO_2 impacts will remain below the California ambient air quality standards (CAAQS) and national ambient air quality standards (NAAQS).

AIR QUALITY Table 22
CGS Construction Impacts (µg/m^3)*

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [b]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2 [a]	1 hour	120.3	131.6	251.9	470	CAAQS	54
	annual	6.3	22.6	28.9	100	NAAQS	29
PM10	24hour	332.6	92.0	424.6	50	CAAQS	849
	annual	3.3	25.5	28.8	20	CAAQS	144
PM2.5	24 hour	26.6 [c]	27.0	53.6	35	NAAQS	150
	annual	0.61	11.2	11.8	12	CAAQS	98
CO	1 hour	1354.7	6,670.0	8,025.0	23,000	CAAQS	35
	8 hour	190.0	3,778.0	3,968.0	10,000	CAAQS	40
SO_2	1 hour	2.1	47.2	49.3	655	CAAQS	8
	3 hour	0.69	42.5	43.2	1,300	NAAQS	3
	24 hour	0.10	7.1	7.2	105	CAAQS	7
	annual	0.008	2.7	2.7	80	NAAQS	3

Source: L&W, 2007b, DR 21; URS, 2007b.
* Micrograms per cubic meter.
[a] One-hour NOx value was determined using Ozone Limiting Method option in AERMOD. Staff adjusted the annual value provided by the applicant by multiplying by the Annual NOx Ratio Method (ARM) EPA default value of 0.75.
[b] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[c] Results are 98th percentile to match the basis of the NAAQS standard.

The applicant's modeling procedures, specifically the use of area sources to model the fugitive dust emissions, greatly overestimate the PM10 and PM2.5 impacts at fence line. If the applicant had modeled the fugitive dust and exhaust equipment together using the two volume sources used for the exhaust PM emission modeling, the modeled PM10 and PM2.5 maximum impacts, based on staff's calculations, would have been reduced to 50.4 µg/m^3 and 5.4 µg/m^3, respectively. Therefore, staff believes that the construction PM2.5 impacts, after the mitigation proposed by the applicant, will not cause a new exceedance of the 24-hour standard; however, the PM10 impacts remain potentially significant and would require all feasible mitigation measures.

Construction Mitigation

Due to the potentially significant PM10 impacts from construction, staff recommends that construction emission impacts be mitigated to the greatest feasible extent including all feasible measures from the LORS, as well as other measures considered necessary by staff to fully mitigate the construction emissions.

Applicant's Proposed Mitigation

The applicant proposes to implement the following measures to reduce emissions during construction activities (E&LW, 2006a, p. 8.1-29, 30). The applicant's PM10 emissions estimates in **AIR QUALITY Table 11** and construction modeling results in **AIR QUALITY Table 22** assume the use of the fugitive dust emission control measures.

Applicant-proposed fugitive dust emission control measures include:

- Water unpaved roads and disturbed areas frequently (at least twice a day).

- Limit speed of vehicles on the construction areas to no more than 10 miles per hour.
- Post visible speed limit signs at construction site entrance.
- Sweep paved internal roads after the evening peak period.
- Increase frequency of watering when wind speeds exceed 15 miles per hour.
- Employ tire washing and gravel ramps prior to entering a public roadway to limit deposits of accumulated mud and dirt on the roads.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- Place sandbags adjacent to roadways to prevent runoff to public roadways.
- Install windbreaks at the windward sides on construction areas prior to the soil being disturbed. The windbreaks shall remain in place until the soil is stabilized or permanently covered.
- Employ dust sweeping vehicles at least twice a day to sweep at least the first 500 feet of public roadways that are used by construction and worker vehicles.
- Sweep newly paved roads at least twice weekly.
- Replace ground cover in disturbed areas as quickly as possible.
- Cover all trucks hauling dirt, sand, soil, or other loose materials and maintain a minimum of six inches of freeboard between the top of the load and the top of the trailer.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive for more than two weeks.
- Pre-wet the soil to be excavated during construction.
- Designate a person to oversee the implementation of the fugitive dust control program.

Applicant-proposed heavy diesel construction equipment exhaust emission control measures include:

- All diesel-fueled engines used for construction of the facility shall be fueled only with ultra-low sulfur diesel which contains no more than 15 ppm sulfur.
- All diesel-fueled engines used in the construction shall have clearly visible tags showing that the engine meets the conditions set forth in this program.
- All construction diesel engines rated at 100 horsepower or above shall meet at least the California Tier 2 Emissions Standards. If a Tier 2 engine is not available, a Tier 1 engine shall be provided. In the case that no Tier 1 engine is available for a particular application, the engine shall be equipped with a catalyzed diesel particulate filter (soot filter), unless the use of a soot filter is certified as not practical by the engine manufacturer.
- All earthmoving equipment and heavy-duty construction-related trucks shall be properly maintained and the engines tuned to the manufacturer's specifications.

- Diesel heavy construction equipment shall not remain running at idle for more than five minutes, to the extent practical.
- All equipment idle times shall be limited to no more than 15 minutes.
- Electric motors shall be employed for construction equipment when feasible.

Adequacy of Proposed Mitigation

In general, the applicant's proposed construction emissions mitigation measures are substantial. The applicant's revised PM10 emission estimate assumes a very aggressive control efficiency factor for fugitive dust (90 percent), which staff believes to be potentially overly optimistic. However, even if the emission and modeling analyses performed by the applicant were assumed to be reasonably accurate, the modeling analysis shows that the mitigated construction PM10 impacts are predicted to be potentially significant beyond the project fence line. Therefore, staff believes that all reasonably feasible construction emission mitigation measures are needed to mitigate the potentially significant construction PM10 impacts.

Staff Proposed Mitigation

Staff recommends construction PM10 and NOx emission mitigation measures that include some of the mitigation measures proposed by the applicant and a few additional construction PM10 emission mitigation measures and compliance assurance measures in Conditions of Certification **AQ-SC1** through **AQ-SC5**.

Staff recommends **AQ-SC1** to require the applicant to have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the construction mitigation program would be provided in the monthly construction compliance report that is required in staff's recommended Condition of Certification **AQ-SC2**.

Staff recommends fugitive dust mitigation measures be provided in Condition of Certification **AQ-SC3**. **AQ-SC3** essentially formalizes the construction emission mitigation measures proposed by the applicant.

Staff recommends Condition of Certification **AQ-SC4** to limit the potential offsite impacts from visible dust emissions from the construction activities.

Staff recommends Condition of Certification **AQ-SC5** to mitigate the emissions from the large diesel-fueled construction equipment. **AQ-SC5** essentially formalizes the construction equipment emission mitigation measures proposed by the applicant.

Based on the relatively short-term nature of the worst-case construction impacts, the distance to sensitive receptors, and staff's recommendation of requiring all feasible construction emission mitigation measures, staff believes that the construction air quality impacts will be less than significant with the implementation of the mitigation measures contained in the recommended conditions of certification.

Operation Impacts and Mitigation

The following section discusses the project's direct ambient air quality impacts, as estimated by the applicant and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

The applicant performed direct impact modeling analyses, including normal operations, turbine startup/shutdown, fumigation, and commissioning impact modeling.

Operational Modeling Analysis

A refined modeling analysis was performed to identify off-site criteria pollutant impacts from operational emissions of the proposed project. Turbine emission rates were first calculated from equipment vendor estimates for 12 load conditions:

- Four load cases: 50 percent load, 75 percent load, 100 percent load, and 100 percent load with duct firing.
- Each load case was evaluated at three different ambient conditions: winter minimum, yearly average, and summer maximum.

These conditions were then modeled to determine the worst-case, short- term conditions, the assumptions to be used for the quarterly emission estimates, and the stack parameters to be used in the modeling analysis.

The AERMOD model was used for the modeling analysis, and the NOx OLM option was used for both one-hour and annual NOx modeling. The applicant's predicted maximum concentrations of the non-reactive pollutants for the CGS are summarized in **AIR QUALITY Table 23.**

AIR QUALITY Table 23
CGS Normal Operating Impacts (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	40.10 [c]	131.6	171.7	470	CAAQS	37
	annual	0.64	22.6	23.2	100	NAAQS	23
PM10	24 hour	6.10	92.0	98.1	50	CAAQS	196
	annual	0.51	25.5	26.0	20	CAAQS	130
PM2.5	24 hour	2.73	27.0	29.7	35	NAAQS	82
	annual	0.51	11.2	11.7	12	CAAQS	98
CO [d]	1 hour	1,395.80	6,670.0	8,066.0	23,000	CAAQS	35
	8 hour	293.10	3,778.0	4,071.0	10,000	CAAQS	41
SO_2 [e]	1 hour	20.33	47.2	67.5	655	CAAQS	10
	3 hour	8.58	42.5	51.1	1,300	NAAQS	4
	24 hour	1.62	7.1	8.7	105	CAAQS	8
	annual	0.04	2.7	2.7	80	NAAQS	3

Source: L&W, 2007b, DR 21; URS, 2007b.
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[b] One-hour and annual NOx values were determined using Ozone Limiting Method option in AERMOD.
[c] This represents the maximum normal turbine/HRSG operating conditions not including engine testing or auxiliary boiler operation. Including engine testing and auxiliary boiler operation, the worst-case NOx project and total impacts are 270.4 ug/m^3 and 402.0 ug/m^3, respectively.
[d] This represents turbine startup, auxiliary boiler operation, and engine testing. Normal operation for CO was not modeled by the applicant, but the normal operating CO impacts would be over an order of magnitude lower than the values presented in this table.

[e] The short term (1 hour, 3 hour, and 24 hour) SO_2 impacts have been corrected to natural gas sulfur content of 1.0 grain/100 SCF.

The applicant's modeling results indicate that the project's normal operational impacts would not create violations of NO_2, SO_2, CO, or PM2.5 standards, but could further exacerbate violations of the PM10 standards. In light of the existing PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, to require mitigation.

Fumigation Modeling Impact Analysis

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

Fumigation conditions are generally only compared to one-hour standards. The applicant analyzed the maximum one-hour air quality impacts under fumigation conditions from the project using the SCREEN3 model (E&LW, 2006a, Table 8.1-25, p. 5.2-39). The results of the analysis, as shown in **AIR QUALITY Table 24**, indicate that the fumigation impacts would be lower than the maximum normal operating emission impacts.

AIR QUALITY Table 24
Maximum CGS Fumigation Impacts (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	one hour	3.09 [b]	131.6	134.7	470	CAAQS	29
CO	one hour	2.82 [b]	6,670.0	6,673.0	23,000	CAAQS	29
SO_2 [c]	one hour	1.16	47.2	48.4	655	CAAQS	7

Source: AFC (E&LW, 2006a, Table 8.1-25, p. 5.2-39; URS, 2007b).
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[b] This represents normal turbine operations. For turbine startup, the maximum NOx and CO one-hour fumigation impacts were determined to be 52.45 and 76.09 ug/m3, respectively.
[c] The SO_2 impacts have been corrected to natural gas sulfur content of 1.0 grain/100 SCF.

Maximum fumigation impacts for the turbines were predicted to occur about 16 kilometers (km) from the facility. The impacts under fumigation conditions have been determined to be lower than the maximum concentrations calculated by AERMOD in complex terrain (see **AIR QUALITY Tables 23** and **25**). This is due to the gas turbine/HRSG stack temperatures which reduce the potential for fumigation and the fact that the SCREEN3 fumigation modeling does not consider elevated terrain.

Startup Modeling Impact Analysis

The applicant modeled facility impacts during the startup of the new turbines/HRSGs along with operation of the auxiliary boiler. Emissions rates for this scenario were based on requested permitted NOx and CO emission rates during startup (see **AIR QUALITY Table 19**). Startup impacts were evaluated using the AERMOD model, and NOx impacts were determined using the NOx OLM modeling option. The results of the startup emissions modeling analysis are shown in **AIR QUALITY Table 25.**

As shown in **AIR QUALITY Table 25**, the worst-case emissions would not cause an exceedance of the one-hour NO_2 standard or the one-hour and eight-hour CO standards. Therefore, the modeling results indicate that the startup emissions do not have the potential to cause significant short-term ambient air quality impacts.

AIR Quality Table 25
CGS Startup Worst-Case Short-Term Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	one hour	329.7	131.6	461.3	470	CAAQS	98
CO	one hour	1,395.8	6,670.0	8,066.0	23,000	CAAQS	35
CO	eight hour	293.1	3,778.0	4,071.0	10,000	CAAQS	41

Source: L&W, 2007b, DR 21; URS, 2007b.
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

Commissioning Modeling Impact Analysis

The applicant evaluated nine separate initial commissioning activities that would occur prior to meeting normal emission limits. The worst case conditions for the short-term NOx and CO impacts, as provided in the discussion prior to **AIR QUALITY Table 12**, were determined and modeled. The applicant has committed to commissioning one turbine at a time prior to installation of the emission control systems and has modeled the impacts considering that only one turbine is operating at the worst-case initial commissioning conditions.

The AERMOD model was used for the modeling analysis, and the NOx OLM option was used for the one-hour NOx modeling. The results of the commissioning emissions modeling analysis are shown in **AIR QUALITY Table 26.**

As shown in **AIR QUALITY Table 26**, the worst-case emissions would not cause an exceedance of the one-hour NO_2 standard or the one-hour and eight-hour CO standards. Therefore, the modeling results indicate that the commissioning emissions do not have the potential to cause significant short-term ambient air quality impacts.

AIR QUALITY Table 26
Maximum CGS Initial Commissioning Impacts

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	one hour	197.0	131.6	328.6	470	CAAQS	70
CO	one hour	2,504.0	6,670.0	9,174.0	23,000	CAAQS	40
	eight hour	888.0	3,778.0	4,666.0	10,000	CAAQS	47

Source: L&W, 2007b, DR 29 and 30; URS, 2007b.
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.

Class I Area Impacts

A criteria pollutant, visibility, and air quality related values (AQRV) analysis of a project's operating emissions impacts to Class 1 areas is required under the federal Prevention of Significant Deterioration (PSD) permitting program. The analysis provided by the applicant showed that the only Class 1 PSD area (which pertains to national parks and national wildlife refuges) located within the 100-kilometer distance prescribed in the PSD regulation is the Yolla Bolly-Middle Eel Wilderness approximately 88 km northwest of the proposed project site. The applicant provided a modeling analysis using the screening version of CALPUFF dispersion model for comparison with U.S. EPA and federal land manager (FLM) Class 1 significant impact levels (SILs) and allowable Class 1 area PSD increments for NOx, PM10, and SO_2. The results of this modeling analysis showed that the impacts for CGS are well below all of these Class 1 area impact criteria (E&LW, 2006a, Table 8.1-26, p. 8.1-52; L&W, 2007b, DR 21).

The applicant provided an assessment of the potential changes to visibility and of nitrogen and sulfur deposition using the screening version of the CALPUFF AQRV model. The results of the modeling analysis showed that visibility passed all screening criteria (E&LW, 2006a, p 8.1-13; L&W, 2007b, DR 21) and that the project's total sulfur and nitrogen deposition values were well below the United States Forest Service prescribed values (L&W, 2007b, DR 21). The U.S. EPA and FLM will review this analysis and make a final determination/approval as part of the PSD permitting process; however, it appears to staff that the potential ambient air visibility impacts to Class 1 PSD areas from the exhaust emissions of the project are less than significant.

Impacts to Emerald Farms

Emerald Farms, an intervenor in this siting case, has significant and sensitive farming operations located near the proposed power plant project site. The applicant provided an analysis regarding Emerald Farms' concerns, noted in its petition to intervene, including air quality impacts to area farming operations (URS, 2007g). The applicant's analysis focused on the impacts of ozone pollution and other criteria and air toxics impacts from the CGS plant operation. Staff agrees with the general findings of the applicant's analysis that the project should not cause significant increases in ozone pollution or otherwise increase ground level pollutants in a manner that would significantly impact Emerald Farms, or other local farming, operations during normal steady state and short-term unsteady state (startup, shutdown and commissioning) power plant operations.

Emerald farms also raised the issue of potential crop damage from sulfur emissions (EF 2007). They note that their farming operations include crops that are sensitive to sulfur emissions (SO_2) and note that their crops are being damaged similar to that shown in the book titled Recognition of Air Pollution Injury to Vegetation (Flagler, 1998) from the existing PG&E Delevan Compressor Station gas turbines. Emerald farms further notes concern with a change in the PG&E sulfur limit to 1 grain per standard cubic foot. First, to address these concerns staff would like to note that the PG&E natural gas sulfur limit has been for some time and remains 1 grain per one hundred standard cubic feet and that on average the actual sulfur content is approximately one-third of the limit. Second, staff's review of the book cited by the Emerald Farms indicates that there are many other factors that can mimic SO2 damage, such as damage from salt, anhydrous ammonia, and various pests and parasites. Finally, staff would like to note that the ambient SO_2 concentrations along with the worst case compressor station and CGS SO_2 concentrations (see **AIR QUALITY Tables 23** and **32**) would remain in an area described as rural by the book (2.6 to 78.6 $\mu g/m^3$) and would be well below that described as moderately polluted (78.6 to 524 $\mu g/m^3$) or heavily polluted (524 to 5,240 $\mu g/m^3$) by this reference. In general, California SO_2 concentrations are comparatively low due to long standing fuel sulfur and SO_2 control regulations and a lack of specific industries normally associated with high localized SO_2 impacts (such as metal smelting facilities or coal-fired power plants). Therefore, it seems unlikely that the damage noted by Emerald Farms is being caused by SO_2 emission from the Delevan compressors and staff does not believe that the proposed CGS SO_2 emissions create any significant concern related to local crop damage.

Staff is concerned that the construction emissions, particularly the fugitive dust emissions during the initial site grading phase, could result in significant coarse particulate emissions that could directly impact nearby crops due to particulate fallout. The particulate modeling results indicated PM10 impacts as high as 332.6 $\mu g/m^3$ at fence line receptors located to the south of the project site. The PM10 emissions are approximately one-half of the total particulate emissions from construction activities, the other half being larger particles. The impacts from the construction dust deposition will lessen quickly with distance, so the fields adjacent to the site fence line will have the most significant deposition related impacts. The nearest agricultural activities to the site are grazing (E&LW, 2006a, Figure 8.9-3) and raising field crops. Whether owned by Emerald Farms or others, the fields do not appear to be regularly planted within a mile of the site along the predominate wind directions (E&LW, 2006a, Appendix G1), lessening the potential deposition impacts to local agriculture. The applicant has proposed extensive particulate emissions controls to mitigate fugitive dust emissions that staff has formalized and augmented in Conditions of Certification **AQ-SC1** to **AQ-SC5**; staff believes with diligent implementation these measures will adequately control particulate emissions during construction.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the **Project Description** section, the applicant proposes to employ DLN, SCR with ammonia injection, and an oxidation catalyst, and to operate exclusively on pipeline-quality natural gas to limit turbine emission levels. The AFC (E&LW, 2006a, Table 8.1-35) provides the following BACT emission limits for the gas turbine/HRSGs:

- NOx: 2.0 ppmvd at 15 percent O_2 (three-hour average, excluding startup/shutdown) and 15.3 lb/hr maximum at full base load and 20.7 lb/hr at maximum duct firing condition.
- CO: 3.0 ppmvd at 15 percent O_2 (three-hour rolling average, excluding startup/shutdown) and 14.0 lb/hr maximum at full base load and 18.9 lb/hr at maximum duct firing condition.
- VOC: 2.0 ppmvd (as CH_4) at 15 percent O_2 and 3.4 lb/hr maximum at full base load and 7.2 lb/hr at maximum duct firing condition. Note: emission calculations are based on 1.3 ppmvd for non duct firing operations.
- PM10: 12.9 lb/hr maximum at base load and 20.1 lb/hr at maximum duct firing condition.
- SO_2: Short-term maximum emissions of 5.5 lb/hr maximum at full base load and 7.2 lb/hr at maximum duct firing condition with fuel sulfur content of 1.0 grains/100 SCF, annual emissions based on average fuel sulfur content of 0.3 grains/100 SCF.
- NH_3:5 ppmvd at 15 percent O_2 and 19.2 lb/hr maximum.

The auxiliary boiler will meet BACT by meeting a NOx emission level standard of 15 ppmvd at 3 percent O_2, and the CO and VOC emissions are specified not to exceed 50 and 10 ppmvd at 3 percent O_2, respectively (URS, 2007g, DR 26 follow up). PM10 and SO_2 emissions will be controlled by the exclusive use of pipeline-quality natural gas. The specific boiler technology to meet these emission levels has not yet been selected.

The emergency engines will meet the most recent ARB/U.S. EPA engine standards, specifically Tier 2 standards for the 1,340 horsepower (hp) emergency generator engine and Tier 3 standards for the 300 hp fire pump engine (L&W, 2007b, DR 27; URS, 2007g, DR 28 follow-up).

Emission Offsets

District Rule 3.6 requires that the applicant provide emission offsets, in the form of banked Emission Reduction Credits (ERC) for the project's emissions exceeding the CCAPCD offset threshold of 25 tons per year. The CGS would require offsets for NOx, VOC, and PM10 based on District Rule 3.6. **AIR QUALITY Table 27** shows the summary of the emission liabilities that need to be offset under Rule 3.6 requirements.

AIR QUALITY Table 27
CGS District Offset Requirements (lb/year)

Offsets Triggered?	NOx	VOC	PM10	SO_2	CO [a]
CGS Emissions [a]	369,736.3	95,534.1	284,154.7	31,233.7	535,049.3
Offset Threshold	50,000	50,000	50,000	50,000	50,000
Offsets Triggered?	**Yes**	**Yes**	**Yes**	**No**	**No**

Source: E&LW, 2006a, Appendix G3, Attachment 1; URS, 2007g, DR 12 and 13; L&W, 2007b, DR 18; URS, 2007g, DR 26 and 28.
[a] Emission offsets are not required for CO in attainment areas since the applicant has demonstrated to the satisfaction of the air pollution control officer (APCO) that the AAQS 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 AAQS.

All air pollutant offsets provided for the project, by rule, are estimated on a quarterly basis. The applicant is proposing over 20 different sources of ERCs to mitigate the project's potential emissions. Two of these ERC sources are stationary source shutdowns, and the other 20 are agricultural burning cessation ERCs. Appendix A provides a complete listing of all of the ERC sources proposed by the applicant, and for the agricultural burning cessation ERCs, identifies the specific crops associated with the burning cessation.

Calculations of the required ERCs are based on the distance of the project from different sources of offsets. The District requires a 1.2:1 offsetting ratio for off-site ERCs within 20 miles, a 1.5:1 offsetting ratio for ERCs located more than 20 miles away but within 50 miles, and a 2:1 offsetting ratio for ERCs with a location more then 50 miles from the project site. The distance from the project site for each of the applicant's proposed ERCs is provided in Appendix A.

The District determines appropriate interpollutant offset ratios on a case-by-case basis. The applicant has proposed the use of a 1.4:1 VOC for NOx interpollutant offset ratio.

The Energy Commission's staff position is that emission reductions need to be provided for all non-attainment pollutants and their precursors at a minimum 1:1 ratio of annual operating emissions. For this project the District's offset requirements would meet or exceed that minimum offsetting goal for all pollutants other than VOC and SO_2. The applicant has proposed to provide VOC and SO_2 emission reduction credits to offset the permitted annual emissions at a 1:1 ratio.

As shown in **AIR QUALITY Table 28** through **AIR QUALITY Table 31**, the applicant has demonstrated, per District requirements and Energy Commission policy, that it owns ERCs in quantities sufficient to offset the project's NOx, VOC, PM10, and SO_2 emissions.

NOx Emission Offsets

AIR QUALITY Table 28 provides a summary of the total project NOx emissions and proposed project offsets. The offsets are totaled for the two stationary source emission reduction credits and the twenty agricultural burn cessation credits. Details regarding the location and quantity of each credit are provided in Appendix A.

AIR QUALITY Table 28
NOx Offsets Available for the CGS

Offset Source Location	Distance	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)	Annual Total (lb)
Stationary Source ERCs	>20 Miles	35,000.0	35,000.0	35,000.0	35,000.0	140,000.0
Stationary Source ERCs	>50 Miles	420.0	707.0	641.0	501.0	2,269.0
Ag. Burn Cessation ERCs	<20 Miles	27,397.2	22,563.7	9,870.5	30,065.4	89,897.0
Ag. Burn Cessation ERCs	>20 Miles	14,735.2	12,385.5	7,237.6	16,196.6	50,554.9
Total NOx ERC Holdings	---	77,643.4	70,719.8	52,762.0	81,862.4	282,987.8
Total NOx Emissions	---	91,206.5	87,231.0	102,682.9	88,615.9	369,736.3
Total NOx ERCs w/District Ratio [a]	---	56,273.6	50,799.9	36,715.1	59,518.9	203,307.7
Total District NOx Offsets Required [b]	---	79,934.1	79,934.1	79,934.1	79,934.1	319,736.3
Deficit	---	-23,660.5	-29,134.2	-43,219.0	-20,415.2	-116,428.6
Total VOC ERCs w/District Ratio [c]	---	75,810.1	72,983.2	63,449.5	79,798.7	292,041.6
Total VOC w/Interpollutant Ratio [b]	---	54150.0	52130.9	45321.1	56999.1	208601.1
Surplus	---	30,489.5	22,996.7	2,102.1	36,583.9	92,172.5

Source: E&L, 2006d.

[a] The appropriate District offset ratios are 1.2:1 for ERCs within 20 miles, 1.5:1 for ERCs within 50 miles, and 2.0:1 for ERCs more than 50 miles from the source to be offset.

[b] The District required that offsets are based on the total project emissions minus the offset threshold of 50,000 lbs/year, and any amount of the 50,000 lbs can be taken in any quarter (L&W, 2007b, DR 2). For the purposes of the table the offset threshold is used to obtain identical quarterly offset requirements.

[c] This represents the VOC ERCs remaining after application of District required offsets for VOC.

The applicant has proposed the use of VOC for NOx interpollutant offsets. VOC and NOx are accepted as the principle precursors of ozone, and through a set of complex reactions these pollutants form ground level ozone. Reductions in either VOC or NOX pollution can reduce ozone formation. Therefore, interpollutant offsets VOC for NOx and NOx for VOC can be used to reach the goal of mitigating a project's impacts to ozone formation. The key issue is the determination of an appropriate interpollutant offset ratio, which depends on the ambient amounts of VOC and NOx emissions and general air chemistry of the area in question. The interpollutant ratio proposed by the applicant (1.4:1) is primarily based on the methods of a study conducted for the San Francisco Bay Area (L&W, 2007b, DR 10). This method employs the use of a chart of ozone isopleths with NOx and VOC daily emissions on the y and x-axis, respectively. Charting the daily emissions the slope for ozone reduction is used to determine the appropriate interpollutant offset ratio. Using this study, the applicant determined an appropriate NOx to VOC ratio of 1.4:1, which would be a VOC to NOx ratio of 0.7:1. However, to be conservative the applicant reversed this ratio to determine their proposed VOC to NOx ratio. Staff does not believe that the presentation of the method is consistent with how it was originally employed in the San Francisco Bay Area where the method considered the air basin's total emissions, while the applicant only considered the daily emissions within Colusa County to make their offset ratio prediction. However, assuming that this general method used in the Bay Area is a reasonable method for the Sacramento Valley, using the emissions within the greater Sacramento valley air basin would still predict a VOC for NOx interpollutant offset ratio of less than 1.4:1. Other methods for determining an appropriate interpollutant offset ratio would include the use of the Urban Airshed Model (UAM), which was the method used by the Sacramento Metro Air Quality

Management District to determine the VOC for NOx interpollutant offset ratio of 2.6:1 for the Cosumnes Power Plant case.

The Air Resources Board has challenged VOC for NOx interpollutant offsets for this project (discussed further in the Agency Comment section of this document). Pending information from ARB that fully explains and substantiates their findings, staff's current opinion is to accept the proposed VOC for NOx interpollutant ratio, which has been accepted by the CCAPCD in its FDOC (COC, 2007d).

The applicant appears to be in compliance with the District's NOx offset requirements and is providing ERCs at a total offset ratio of greater than 1:1 for the CGS project. The ERCs being provided in the third quarter are substantially lower than those provided in other quarters, requiring a disproportionate use of the District offset threshold; the third quarter is also when the highest ozone concentrations occur in the project site area. However, staff will condition the facility so that the applicant provides enough NOx and VOC, considering the interpollutant offset ratio, to offset the project's NOx and VOC at a minimum 1:1 offset ratio for all quarters. Therefore, staff has determined that this offset proposal satisfies CEQA mitigation requirements.

VOC Emission Offsets

AIR QUALITY Table 29 provides a summary of the total project VOC emissions and identifies the project's proposed ERC totals. Details regarding the values of each of the 22 VOC ERC sources are provided in Appendix A.

AIR QUALITY Table 29
VOC Offsets Available for the CGS

Offset Source Location	Distance	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)	Annual Total (lb)
Stationary Source ERCs	>20 Miles	87,500.0	87,500.0	87,500.0	87,500.0	350,000.0
Stationary Source ERCs	>50 Miles	199.0	335.0	304.0	238.0	1,076.0
Ag. Burn Cessation ERCs	<20 Miles	24,852.3	20,947.2	10,044.3	27,277.4	83,121.3
Ag. Burn Cessation ERCs	>20 Miles	13,318.9	11,862.7	11,834.3	14,639.0	51,654.9
Total VOC ERC Holdings	---	125,870.2	120,644.9	109,682.6	129,654.4	485,852.2
Total VOC Emissions	---	24,712.3	23,382.1	23,795.6	23,644.1	95,534.1
Total VOC ERCs w/District Ratio [a]	---	88,022.4	83,865.3	74,745.1	90,942.8	337,575.7
Total District VOC Offsets Required [b]	---	12,212.3	10,882.1	11,295.6	11,144.1	45,534.1
Surplus	---	75,810.1	72,983.2	63,449.5	79,798.7	292,041.6

Source: E&LW, 2006d.
[a] The appropriate District offset ratios are 1.2:1 for ERCs within 20 miles, 1.5:1 for ERCs within 50 miles, and 2.0:1 for ERCs more than 50 miles from the source to be offset.
[b] The District required that offsets are based on the total project emissions minus the offset threshold of 50,000 lbs/year, and any amount of the 50,000 lbs can be taken in any quarter (L&W, 2007b, DR 2). For the purposes of the table, the two quarters needing the most of the offset threshold (second and third) were made to show no surplus or deficit, and the other two quarters were given the remaining amount of the offset threshold evenly.

The applicant is in compliance with the District's VOC offset requirements; however, the District's offset requirements are less than a total offset ratio of 1:1. Therefore, staff is

proposing a requirement that the VOC ERCs provided meet a minimum of a 1:1 ratio and will add such a requirement in the conditions of certification. The applicant has enough VOC ERCs in hand to meet the 1:1 offset requirement, even considering interpollutant VOC for NOx requirements as shown above in **AIR QUALITY Table 28**. With its additional recommended VOC ERC mitigation, staff has determined that this offset proposal satisfies CEQA mitigation requirements.

PM10 Emission Offsets

AIR QUALITY Table 30 provides a summary of the total project PM10 emissions and identifies the project's proposed ERC totals. Details regarding the values of each of the 22 PM10 ERC sources are provided in Appendix A.

AIR QUALITY Table 30
PM10 Offsets Available for the CGS

Offset Source Location	Distance	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)	Annual Total (lb)
Stationary Source ERCs	>20 Miles	33,500.0	33,500.0	33,500.0	33,500.0	134,000.0
Stationary Source ERCs	>50 Miles	6,034.0	10,156.0	9,218.0	7,201.0	32,609.0
Ag. Burn Cessation ERCs	<20 Miles	33,311.0	28,127.5	13,473.2	36,563.4	111,475.0
Ag. Burn Cessation ERCs	>20 Miles	17,852.4	15,975.0	15,025.0	19,622.6	68,475.0
Total PM10 ERC Holdings	---	90,697.4	87,758.5	71,216.2	96,887.0	346,559.0
Total PM10 Emissions	---	70,588.0	70,781.5	71,399.3	71,385.7	284,154.7
Total PM10 ERCs w/District Ratio [a]	---	65,011.1	61,500.9	48,186.7	69,485.1	244,183.7
Total District PM10 Offsets Required [b]	---	61,834.6	61,500.9	48,186.7	62,632.4	234,154.7
Surplus	---	3,176.5	0	0	6,852.7	10,029.2

Source: E&LW, 2006d.
[a] The appropriate District offset ratios are 1.2:1 for ERCs within 20 miles, 1.5:1 for ERCs within 50 miles, and 2.0:1 for ERCs more than 50 miles from the source to be offset.
[b] The District required that offsets are based on the total project emissions minus the offset threshold of 50,000 lbs/year, and any amount of the 50,000 lbs can be taken in any quarter (L&W, 2007b, DR 2). For the purposes of the table the two quarters needing the most of the offset threshold, second and third were made to show no surplus or deficit and the other two quarters were given the remaining amount of the offset threshold evenly.

The applicant appears to be in compliance with the District's PM10 offset requirements and is providing PM10 ERCs at a greater than 1:1 total offset ratio for the CGS project.

The District does not specifically require the offsetting of PM2.5 emissions or require PM10 ERCs to speciate their PM2.5 fractions. The PM emissions from the CGS are controlled combustion emissions and are therefore predominately PM2.5. The offset sources are primarily reductions in combustion emissions, where the stationary source emission reductions are from sources that are also predominately combustion sources and the agricultural burn cessation emission credits are from the unconfined combustion of field crops. A review of the ARB approved emission factors for burning of field crops indicates that PM2.5 is 95 percent of the PM10 emissions. Therefore, staff believes that the ERCs being used to offset the PM10 emissions are all predominately also PM2.5

emission reductions and will provide a minimum 1:1 offset ratio for the project's PM2.5 emissions.

SO_2 Emission Offsets

AIR QUALITY Table 31 provides a summary of the total project SO_2 emissions and identifies the project's proposed ERC totals. Details regarding the values of each of the 21 SO_2 ERC sources are provided in Appendix A.

AIR QUALITY Table 31
SO_2 Offsets Available for the CGS

Offset Type	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)	Annual Total (lb)
Stationary Source ERCs	166.0	279.0	254.0	198.0	897.0
Ag. Burn Cessation ERCs	8,927.5	7,416.2	3,455.3	9,806.2	29,605.1
Total ERC Holdings	9,093.5	7,695.2	3,709.3	10,004.2	30,502.1
Total Emissions [a]	8,103.6	7,662.7	7,736.2	7,731.2	31,233.7
Surplus/Deficit @ 1:1	989.9	32.5	-4,026.9	2,273.0	-731.6

Source: E&LW, 2006d.
[a] The quarterly requirement amounts are based on an average fuel sulfur content of 0.3 grains/100 SCF of natural gas, and these emission have been recalculated by staff as noted below **AIR QUALITY Table 17**.

The applicant is not required by the District to provide SO_2 offsets, but is proposing to offset annual SO_2 emissions per Energy Commission mitigation requirements. The applicant has adjusted the emission estimate of SO_2 for this purpose, to reflect the long-term average fuel sulfur content rather than using the worst-case, short-term maximum fuel sulfur content. Originally the applicant used a long-term sulfur content of 0.20 grains per 100 SCF; however, staff's evaluation of long-term natural gas sulfur content data from PG&E, given the project location and likely sources of natural gas, suggested a higher value. The applicant then adjusted this value to 0.30 grains per 100 SCF, which staff considers reasonable for the purposes of determining actual annual emissions for CEQA mitigation purposes.

The total annual offsets shown above in **AIR QUALITY Table 31** are slightly less than the calculated maximum annual emissions, and an additional 731.6 pounds of SO_2 ERCs are needed to fully offset the project at a 1:1 ratio. The current offset proposal exceeds the quarterly emission in every quarter except the third quarter. Secondary PM formation from SO_2 will be in the form of very fine particulate or aerosols (PM2.5), so a consideration of peak PM2.5 concentrations must be evaluated to assess this offset proposal. Since the peak PM2.5 ambient concentrations typically occur in the first and fourth quarters and SO_2 conversion occurs more readily during cool and wet conditions, the offset package seems to appropriately cover the project's emission during the quarters of highest secondary particulate formation. Therefore, staff believes that the offset package's deficit, which is based on a larger deficit in the third quarter, would be adequately covered by providing the necessary additional 731.6 pounds of SO_2 ERCs using an ERC certificate from any combination of calendar quarters.

Additionally, there is a real-world safety margin in the emission estimate as it is unlikely that the CGS will operate more than 80 percent of its permitted maximum fuel

throughput. Therefore, staff has determined that this offset proposal, as recommended to be adjusted by staff, satisfies CEQA mitigation requirements.

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the project's proposed emission controls/emission levels meets BACT requirements and that the proposed emission levels are reduced to the lowest technically feasible levels. Staff has determined that the proposed emission controls and emission levels, along with the proposed emission offset package, mitigate all project impacts to less than significant.

Staff has made a preliminary determination that the applicant's offset proposal meets both District requirements and CEQA mitigation requirements. Staff's acceptance of this 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. District personnel traveled to the Energy Commission offices to discuss and demonstrate the extensive recordkeeping and compliance requirements for their agricultural burn cessation ERC program. The District also provided information regarding the source and values of the crop burning emission estimates, including a discussion of the District's program in Appendix C of the PDOC (COC, 2007d). Specific aspects of the District's agricultural burn cessation ERC program include:

- The crop burning emission factors were generated and approved by ARB.
- The District maintains an extensive database that can interface with Geographic Information System (GIS) mapping programs.
- The database is constructed so that it does not allow fields that have been granted ERCs to be granted burn permits (that is, a no burn list is maintained).
- The regulations require that parcels with ERCs cannot be sold without a deed restriction, prior to sale, foregoing all open biomass burning on the property.
- Colusa County enforces this no-burn list with both District staff and other county staff such as agricultural department employees.

Staff believes that the CCAPCD agricultural burn cessation ERC program provides adequate assurances that the agricultural burn cessation ERCs would fully mitigate the project over time and that these ERCs meet CEQA mitigation requirements.

Staff Proposed Mitigation

Staff is proposing conditions of certification (**AQ-SC6** and **AQ-SC7**) that would ensure ongoing compliance and ensure that the license is amended as necessary to incorporate changes to the air quality permits and any proposed changes to the offset proposal, as well as requiring the applicant to obtain a small amount of additional SO_2 offsets to fully mitigate the SO_2 emissions.

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. . . 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 §15355 and 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 and present projects as well as those in the reasonably foreseeable future.

This analysis is primarily concerned with "criteria" air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely will a project cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of best available control technology for new sources of emissions and restrictions of emissions from existing sources of air pollution.

Much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" section describes the air quality background in Colusa County and the Sacramento Valley Air Basin, including a discussion of historic ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" section discusses the project's contribution to the local existing background caused by project construction. The "Operation Impacts and Mitigation" section discusses the project's contribution to the local existing background caused by project operation. The following section includes four additional 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," the project's direct operating emissions combined with other local major emission sources;
- A discussion of chemically reactive pollution impacts—ozone and PM2.5; and
- A discussion of greenhouse gas reporting.

Summary of Projections

The Colusa County Air Pollution Control District is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone and particulate matter. Colusa County is currently designated either as attainment or unclassifiable with respect to the federal ambient air quality standards; therefore the District is not required to have a federal Air Quality Management Plan. Colusa County Air Pollution Control has jointly developed an Air Quality Attainment Plan (AQAP) for the Northern Sacramento Valley Air Basin (NSVAB) to deal with state ambient air quality attainment. This plan includes certain stationary source, area source, and transportation control measures (TCMs). These plans are

updated roughly every three years and the most recently adopted plan is the 2003 AQAP (NSVAB, 2003).

2003 Air Quality Attainment Plan

The AQAP notes that analysis of Colusa County monitoring sites indicated that transport from the broader Sacramento area was significant or overwhelming. Therefore, the AQAP to a large degree relies on long-term, area-wide emission reduction strategies such as those for mobile sources. Colusa County is not a highly industrialized county, and in the 2003 AQAP, Colusa County did not propose any control measures not already promulgated in the District rules and regulations that would be specifically applicable to the CGS. The control measures that were proposed focused on the reduction of VOC emissions from coating application and gasoline retailing.

Since the project will comply with all existing emission control regulations and will fully offset all non-attainment pollutant and precursor emissions, staff believes that the project will not conflict with the District's AQAP.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see Operational Modeling Analysis portion of this section) the contributions to localized cumulative impacts can be estimated. To represent "past" and, to an extent, "present projects" that contribute to ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see SETTING-EXISTING AIR QUALITY) referred to as the "background." The staff undertakes the following steps to estimate additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new application for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Based on staff's modeling experience, beyond six miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments, or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIR) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated, from the applications with the air district for point sources or initiating the EIR process for area sources provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s) and determine what sources must be modeled and how they must be modeled.

- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project; thus, a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than two miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source in high impact areas near that source's fence line: it is not truly a cumulative impact of the CGS project if the high impact area is the result of high fence line concentrations from another stationary source and CGS is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data, and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on informational requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise; the applicant has already performed a modeling analysis of the project alone (see Operational Modeling Analysis portion of this section); and the applicant can act on its own to modify the project as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or applicant (see DIRECT/INDIRECT IMPACTS AND MITIGATION portion of this section).

The cumulative assessment for the CGS includes the adjacent PG&E Delevan Compressor Station gas turbines, the only other nearby industrial emission source, to ensure that there are no significant localized impacts due to the proximity of these two major source facilities. The applicant obtained stack parameters and emission data for the PG&E Delevan Compressor Station and followed the same modeling procedures used for the CGS operating emissions modeling analysis, except the modeling did not include the same nested receptor grid; therefore, the modeled impact values in some cases were determined to be less than the worst-case impacts for the project alone during startup conditions.

The results of this cumulative modeling effort, **AIR QUALITY Table 32**, show that the CGS will contribute to existing violations of the PM10 AAQS standards. The results also show that the CGS, along with the PG&E Delevan Compressor Station gas turbines, would have the potential to contribute to new AAQS violations for one-hour NOx, but not for any of the other pollutants modeled.

AIR QUALITY Table 32
Cumulative Impacts Modeling Results (ug/m^3)

Pollutant	Averaging Time	Maximum Modeled Concentration (ug/m^3)	Background[a] (ug/m^3)	Total Impact (ug/m^3)	Limiting AAQS (ug/m^3)	Percent of Limiting Standard
NO_2	1 Hour	345.27	131.6	**476.9**	470	**101**
	Annual	1.23	22.6	23.8	100	24
CO	1 Hour	952.36	6,670.0	7,622.0	23,000	33
	8 Hour	172.66	3,778.0	3,951.0	10,000	40
PM10	24 Hour	4.78	**92.0**	**96.8**	50	**194**
	Annual	0.51	**25.5**	**26.0**	20	**130**
PM2.5	24 Hour	2.59	27.0	29.6	35	85
	Annual	0.51	11.2	11.7	12	98
SO_2 [b]	1 Hour	14.17	47.2	61.4	655	9
	3 Hour	8.30	42.5	50.8	1300	4
	24 Hour	1.81	7.1	8.9	105	8
	Annual	0.04	2.7	2.7	80	3

Source: L&W, 2007b, DR 21; URS, 2007b.
[a] Background values have been adjusted per staff recommended background concentrations shown in **AIR QUALITY Table 10**.
[b] The short term (1 hour, 3 hour, and 24 hour) SO_2 impacts have been corrected to natural gas sulfur content of 1.0 grain/100 SCF.

Staff does not believe that the highest background NOx concentration and highest Ozone Limiting Method (OLM) concentration will actually be coincident. Staff will review this modeling further and provide a more refined modeling analysis of the maximum one-hour NO_2 impacts in the FSA. However, if this refined analysis still shows the potential to exceed the one-hour NO2 standard, then staff will recommend limiting cold starts to one turbine/HRSG at a time to reduce maximum hourly facility emissions and reduce impacts below the one-hour NO_2 CAAQS.

Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.) Staff has conducted a thorough cumulative impacts analysis and if the one-hour NO_2 impact situation discussed above is resolved, then it is staffs opinion that the CGS would not contribute to a cumulative impact.

CHEMICALLY REACTIVE POLLUTANT IMPACTS

Ozone Impacts

The project's gaseous emissions of NOx, SO_2, VOC, and ammonia can contribute to the formation of secondary pollutants ozone and PM10/PM2.5.

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the modeling to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the CGS do have the potential (if left unmitigated)

to contribute to higher ozone levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

PM2.5 Impacts

Secondary PM10 formation, which is assumed to be 100 percent PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as “ammonia rich” and “ammonia poor.” The term “ammonia rich” indicates that there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case will not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an “ammonia poor” environment, there is insufficient ammonia to establish a balance, and thus additional ammonia will tend to increase PM2.5 concentrations.

The Sacramento Valley, like the San Joaquin Valley, due to its extensive agricultural production is considered to be ammonia rich. Therefore, the ammonia emissions from the CGS might not lead to substantial further formation of ammonium nitrate or sulfate. While there will certainly be some conversion from the ammonia emitted from the CGS, there is currently no regulatory model that can predict the conversion rate. However, because of the known relationship of NOx and SOx emissions to PM2.5 formation, it can be said that the emissions of NOx and SOx from the CGS do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region.

The applicant is proposing to mitigate the project’s NOx, VOC, SO_2, and PM10 emissions through the use of emission offsets and limit the ammonia slip emissions to 5 ppm. The NOx, VOC, SO_2, and PM10 offsets are proposed by the applicant to be provided at a minimum 1:1 ratio and will be higher than 1:1 for PM10 and NOx as required by District rules. With the proposed emission offsets, it is staff’s belief that the project will not cause significant secondary pollutant impacts.

GREENHOUSE GASES

The generation of electricity can produce air emissions known as greenhouse gases in addition to the criteria air pollutants. Greenhouse gases are known to contribute to the warming of the earth’s atmosphere. These include primarily carbon dioxide, nitrous oxide (N_20, not NO or NO_2, which are commonly know as NOx or oxides of nitrogen), and methane (unburned natural gas). Also included are sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) from transformers and chillers.

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

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

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

The ARB is expected to adopt early action GHG reduction measures by July 2007 and establish a statewide emissions cap by January 2008. By January 1, 2008, ARB is scheduled to adopt regulations requiring mandatory GHG emissions reporting and define the statewide GHG emissions cap for 2020. ARB would adopt a plan by January 1, 2009 that would indicate how emission reductions would be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Then, during 2009, ARB staff would draft rule language to implement its plan and hold public workshops on each measure including market mechanisms (ARB, 2006c). Strategies that the state might pursue for managing GHG emissions in California are identified in the California Climate Action Team's Report to the Governor (CalEPA, 2006). Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA, 2006).

The Electricity Greenhouse Gas Emission Standards Act (SB1368[1]) was also enacted in 2006, requiring generation and contacts be subject to an GHG or Environmental Performance Standard. At its January 25, 2007 meeting, the CPUC adopted an Emissions Performance Standard for the state's Investor Owned Utilities of 1,100 pounds (or 0.5metric tons) CO_2 per megawatt-hour (MWh). The Emissions Performance Standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more,

[1] Public Utilities Code § 8340 et seq.

including contracts with power plants located outside of California.[2] A similar performance standard is undergoing rulemaking by the CEC for the Publicly Owned Utilities, and it should be adopted by June 30, 2007.[3]

Staff recommends condition of certification **AQ-SC8**, which requires the project owner to report the quantities of relevant greenhouse gases emitted as a result of electric power production. Staff believes that **AQ-SC8**, with the reporting GHG emissions, will enable the project to be consistent with the regulations and policies described above. The greenhouse gas emissions to be reported in condition of certification **AQ-SC8** are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power.

COMPLIANCE WITH LORS

The Colusa County Air Pollution Control District submitted a Preliminary Determination of Compliance (PDOC) for the CGS project on April 20, 2007 (COC, 2007d). Staff provided comments to the District regarding the PDOC (CEC, 2007n) that were addressed in the Final Determination of Compliance (FDOC) published on June 11, 2007 and its addendum published on June 29, 2007 (COC, 2007h; CEC 2007p). Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the conditions of certification.

Staff has considered minority populations in its analysis of air quality impacts. The minority populations (as identified in **Socioeconomics Figure 1**) are well below 50 percent, which indicates that the site area would not have the potential for local environmental justice issues. Additionally, no potential significant adverse impacts have been identified, and therefore, there are no environmental justice issues.

FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit. This project will require a PSD permit from U.S. EPA prior to initiating construction. The PSD permit will include compliance requirements for the New Source Performance Standard for gas turbines (40 CFR 60 Subpart KKKK). The applicant provided the PSD permit application to the U.S. EPA, and the application has been deemed complete (U.S. EPA, 2007a). The PSD permit may not be completed until after the completion of this licensing case.

U.S. EPA may provide comments this Preliminary Staff Assessment. Staff will evaluate any comments received from U.S. EPA and address them in the Final Staff Assessment.

STATE

The applicant will demonstrate that the project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause

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

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

nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

LOCAL

The District has issued an FDOC (COC, 2007h), which states that the proposed project is expected to comply with all applicable District rules and regulations.

The District rules and regulations specify the emissions control and offset requirements for new sources such as the CGS. Best available control technology will be implemented, and emission reduction credits, proposed by the applicant and approved and certified by the District, will fully mitigate project non-attainment pollutant emissions (including precursors) so that they would be consistent with the strategies and future emissions anticipated under the AQMP.

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the CGS, the District will prepare and present as evidence to the Energy Commission a Determination of Compliance (DOC), both Preliminary DOC and Final DOC documents and public comment periods. The FDOC was published on June 11, 2007 with a revised FDOC page 43 docketed on July 2, 2007. That document evaluates whether and under what conditions the proposed project will comply with the District's applicable rules and regulations, as described below.

Regulation I - General Provisions

This regulation specifies rules for subject sources regarding: 1) emissions monitoring, 2) records and reports on monitoring data, facility operation records, and fuel composition data, 3) testing and field inspection of the source, 4) reporting of shut-down or restart of air pollution control equipment during scheduled maintenance, and 5) equipment breakdowns which may result in an emissions violation. The District's FDOC provides conditions that cover the applicable requirements of this regulation.

Regulation II – Prohibitions

Rule 2.10 Nuisance

This rule restricts the emission of any contaminant which may cause injury, detriment, nuisance or annoyance to persons or the public, or which endanger the comfort, repose, health, or safety of any person or the public, or which cause or have a natural tendency to cause injury or damage to business or property. Based on experience with similar equipment, the new CGS equipment is not expected to cause a public nuisance; therefore, compliance with Rule 2.10 is expected.

Rule 2.13 Visible Emissions

This rule restricts visible emissions from a single source for a period of more than three minutes in any one hour which is as dark as or darker in shade than No. 2 on the Ringelmann Chart. It is unlikely that there will be visible emissions from the CGS equipment, other than infrequent water vapor plume emissions, with the exception of the immediate period of emergency and fire pump engine startup. The CGS equipment is expected to comply with the provisions of this rule.

Rule 2.15 Particulate Matter Concentration

This rule restricts the discharge of particulate matter in excess of 0.3 grains per standard dry cubic foot of gas. When the source involves a combustion process, the concentration must be calculated to 12 percent carbon dioxide (CO_2). All CGS emission sources are expected to meet this limit.

Rule 2.16 Dust and Fumes

This rule restricts the discharge in any one hour from any source dust or fumes in excess of specified amounts that are based on process weight throughput. Liquid and gaseous fuel are not included as process weight; therefore this rule does not apply to the CGS project.

Rule 2.22 Sulfur Oxides

This rule restricts the discharge of sulfur oxides in excess of 0.2 percent by volume (2,000 ppm) calculated as SO_2. The project's use of pipeline-quality natural gas and ultra-low sulfur diesel fuel will assure compliance with this rule.

Rule 2.23 Reduced Sulfur Compounds

This rule restricts the ground level concentrations of total reduced sulfur compounds, expressed as hydrogen sulfide, in excess of 0.03 ppm for a period of one hour. This facility should not regularly emit total reduced sulfur compounds, except for small amounts of fugitive emissions from on-site natural gas piping components; pipeline quality natural gas meets the reduced sulfur limits of this rule.

Rule 2.36 Stationary Internal Combustion Engines

This rule provides for emission limits for stationary internal combustion engines. The two CGS emergency engines would comply with the emission requirements of this rule as they will meet appropriate U.S. EPA/ARB nonroad diesel engine standards for new engines (Tier 2 and 3 for the emergency generator and fire pump engines, respectively); however, as emergency engines, they are actually exempted from the requirements of this rule.

Rule 2.39 Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters

This rule requires boilers to meet reasonable available control technology NOx emission levels. This rule will be complied with through the issuance of the FDOC, which will require the CGS boiler to meet BACT emission levels.

Rule 2.41 Determination of Reasonably Available Control Technology for the Control of Oxides of Nitrogen from Stationary Gas Turbines

This rule specifies that the gas turbines meet reasonably available control technology requirements. This rule will be complied with due to the requirement of best available control technology for the gas turbines as part of Regulation III.

Regulation III – Permits

Rule 3.1 Permits Required

The main functions of the regulation are to allow for the issuance of Authorities to Construct (New Source Review) and Permits to Operate under Title V, the application of BACT, and the securing of emission offsets. The issuance of the FDOC will assure compliance with this rule.

Rule 3.6 Standards for Authority to Construct (New Source Review)

The purpose of this rule is to establish preconstruction review requirements for new and modified stationary sources of air pollution for use of BACT, analysis of air quality impacts and to ensure that the operation of such sources does not interfere with the attainment of AAQS. Additionally, this rule specifies the requirements for emission offsets.

The FDOC has concluded that the emission controls proposed for the CGS emission sources meet BACT and that the emission offset package proposed by the applicant satisfies the requirements of this rule.

Rule 3.17 Permits to Operate for Sources Subject to Title V of the 1990 Clean Air Act Amendments

This rule implements the requirements of Title V of the federal Clean Air Act as amended in 1990 (CAA) for permits to operate. Title V provides for the establishment of operating permit programs for sources that emit regulated air pollutants, including attainment and non-attainment pollutants. This rule will be complied with after the source starts operation, with the initial Title V permit application being due to the District within the first year of CGS operation.

AGENCY COMMENTS

The Air Resources Board, in a letter to the Energy Commission received after the end date of the PDOC comment period (ARB, 2007d), has stated that VOC for NOx interpollutant offsets should not be allowed at any offset ratio. However, ARB did not provide any public information that explains and substantiates this finding. Additionally, staff believes that the ARB should be working directly with the CCAPCD on a resolution of this issue rather than providing comment to the Energy Commission.

Pending information from ARB that fully explains and substantiates their finding of no acceptable VOC for NOx interpollutant offset ratio, staff's preliminary opinion is to accept the proposed VOC for NOx interpollutant ratio, as accepted by CCAPCD in the project's FDOC (COC, 2007h).

NOTEWORTHY PUBLIC BENEFITS

No air quality related noteworthy public benefits have been identified.

CONCLUSIONS

Staff's analysis concludes that the CGS would likely comply with all laws, ordinances, regulations, and standards and would result in an insignificant impact under CEQA if CGS provides the emission offsets, in quantities recommended by staff and the District in **AQ-SC7** and **AQ-27**, respectively, as mitigation in a timely manner. From staff's perspective, a timely manner as recommended by the District in **AQ-27** means that for PM10 the identified ERCs are surrendered prior to construction and for NOx, SOx, and VOC, the identified ERCs are surrendered prior to first turbine fire. Staff has identified in **AQ-SC7** a small amount of SO_2 ERCs that must be obtained prior to construction to fully offset the facilities SO_2 emissions.

To confirm staff's conclusions of insignificant impacts, staff will need to perform an additional cumulative impacts analysis, due to the applicant's modeling analysis showing a very minor exceedance of the state's one-hour NOx Ambient Air Quality Standard. However, staff is certain that additional assessment modeled maximum impact plus actual hourly NO_2 background will prove that the worst-case cumulative impacts will not exceed any ambient air quality standard. Staff requires the following information from the applicant to complete this additional cumulative modeling impact analysis:

- Staff requires the applicant to provide hourly NO_2 concentration files for the Yuba City-Almond Street monitoring station covering 2001 through 2005 to complete the NOx OLM analysis for cumulative impacts.

Staff proposes Condition of Certification **AQ-SC7** to provide reasonable verification that the applicant and the CCAPCD have met their respective obligations under CCAPCD NSR rules and staff requirements to offset the project emissions of NOx, SO_2, VOC, and PM10.

Staff has proposed a number of permit conditions that are in addition to the permit conditions that the CCAPCD has proposed. In most cases the staff-proposed permit conditions deal with air quality issues that the CCAPCD is not required to address. The staff-proposed conditions of certification are summarized as follows. Conditions **AQ-SC1** through **AQ-SC5** are construction-related permit conditions. Conditions **AQ-SC6** provides the administrative procedure requirements for project modifications. Condition **AQ-SC7** is a reporting requirement for the providing of emission offsets. Condition **AQ-SC8** is the Energy Commission greenhouse gas reporting requirement. Condition **AQ-SC9** is a quarterly emission reporting requirement augmenting District Condition **AQ-22**.

Conditions **AQ-1** through **AQ-29** are the CCAPCD permit conditions with staff-proposed verification language. **AQ-29** is related to the Hazardous Air Pollutant (HAP) emissions from the CGS, which are evaluated separately in the **Public Health** section of the Preliminary Staff Assessment.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends the following conditions of certification to address the impacts associated with the construction and operation of the CGS. These conditions include

the CCAPCD-proposed conditions from the FDOC, with appropriate staff-proposed verification language for each condition, as well as Energy Commission staff-proposed conditions. The conditions presented below may be revised to address comments on staff's Preliminary Staff Assessment.

STAFF CONDITIONS

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 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 an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with conditions **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 the 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) Areas to be excavated shall be thoroughly pre-wetted prior to excavation.

b) 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 reduced or eliminated during periods of precipitation.

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

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

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

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

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

h) 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.

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

j) 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.

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

l) On-site paved roads shall be swept at least once daily after the evening peak period.

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

n) 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 in a manner to provide at least two feet of freeboard.

o) 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.

p) Ground cover will be replaced in disturbed areas as soon as possible.

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 that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMM or Delegate shall 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 the additional mitigation measures will be accomplished within the time limits specified.

AQ-SC5 Diesel-Fueled Engines Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for the 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 be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.

b) 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.

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

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

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

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

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

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

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

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

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

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

f) All diesel heavy construction equipment shall not remain running at idle for more than five minutes, to the extent practical.

g) 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) copies of all diesel fuel

purchase records, (3) a list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained, and (4) 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 shall surrender the emission offset credits listed in Appendix A or a modified list, as allowed by this condition, at the time and in the quantities required by condition **AQ-24** and herein. The project owner may request CPM approval for any substitutions or modification of credits listed in Appendix A. 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; the requested change(s) clearly will not cause the project to result in a significant environmental impact; and each requested change is consistent with applicable federal and state laws and regulations. In addition to the offset requirements of stipulated in **AQ-24**, the applicant will provide sufficient VOC and SO_2 ERCs to mitigate the VOC and SO_2 emissions on a 1:1 basis annually, which will require the applicant to obtain 731.6 pounds of additional SO_2 ERCs prior to initiation of construction.

Verification: The project owner shall provide a record of the required additional SO_2 ERC source(s) prior to initiation of construction. The project owner shall submit to the CPM a list of the ERC certificates and quantities surrendered to the District within 30 days of their surrender. The project owner shall request any changes to the ERC certificates to be surrendered at least 60 days prior to their surrender date as required in condition AQ-24. If the CPM, in consultation with the District, approves a substitution or modification, the CPM shall file a statement of the approval with the commission docket and mail a copy of the statement to every person on the post-certification mailing list. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 Until the California Global Warming Solutions Act of 2006 (AB32) is implemented, the project owner shall either participate in a GHG registry approved by the CPM, or report on a annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production.

The project owner shall maintain a record of fuels types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) in combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), (4) internal combustion engines, (4) flares, and/or (5) for the purpose of startup, shutdown, operation or emission controls.

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

Pollutant	Test Method
CO_2	EPA Method 3A
CH_4	Protocol:EPA Method 18 (VOC measured as CH_4)

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

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

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

Verification: The project annual greenhouse gas emissions shall be reported, as a CO_2 equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM as part of the fourth Quarterly or the annual Air Quality Report, until such time that GHG reporting requirements are adopted and in force for the project as part of the California Global Warming Solutions Act of 2006.

AQ-SC9 The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter, as also required under Condition of Certification **AQ-19**, that include operational and emissions information as necessary to demonstrate compliance with the conditions of certification herein. The Quarterly Operation Report will specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit the Quarterly Operation Reports to the CPM and APCO no later than 30 days following the end of each calendar quarter.

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (COC2007H, CEC 2007P)

AQ-1 All facility operating staff shall be advised of and familiar with these permit conditions.

Verification: The project owner shall submit to the CPM and APCO signed records of facility operating staff indicating review of permit conditions at least 30 days prior to commencement of operation and shall maintain this training and records documenting this training at the site for inspection.

AQ-2 The "Right of Entry," as provided by the California Health and Safety Code Section 41510 of Division 26, shall apply at all times.

Verification: The project owner shall make the site available to representatives of the District, ARB, and the Energy Commission for inspection, including securing samples of emissions or any records required to be maintained in connection with the emissions sources.

AQ-3 In the case of shutdown or restart of air pollution control equipment for necessary scheduled maintenance, the intent to shut down such equipment shall be reported to the Air Pollution Control Officer at least 24 hours prior to the planned shutdown. Such notification does not exempt the facility from complying with all permit limits and requirements.

Verification: The project owner shall submit to the CPM and APCO notification of scheduled maintenance of air pollution control equipment at least 24 hours prior to any planned shutdowns.

AQ-4 If any upset or breakdown occurs with equipment under permit in such a manner that may cause excess emissions of air contaminants, the APCO shall be notified of such failure or breakdown within 24 hours or by 9:00 a.m. by the following working day. The person responsible shall also submit a written statement of full disclosure of the upset/breakdown to the District within 72 hours. The report shall contain the date, time, duration, estimated emissions, cause, and remedy.

Verification: The project owner shall comply with the notification requirements of the District and submit written copies of these notification reports to the CPM and the APCO as part of the Quarterly Operation Reports (**AQ-22**).

AQ-5 Fugitive emissions, including dust and odors, shall be controlled at all times such that a nuisance is not created at any point beyond the facility's property lines.

Verification: The project owner will document any complaints that it has received from the public in the Quarterly Operation Reports (**AQ-22**). The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission.

AQ-6 A person shall be designated to oversee the fugitive dust control program described in the application and this document. Entry roads to the proposed facility site will be paved prior to commencing construction. During construction, the people on site shall access real-time weather information from the Western Weather Group to determine the prevailing local wind speed. If wind gusts at the Maxwell weather station exceed 15 mph, construction personnel shall increase the frequency of watering the exposed soil. All of the mitigation measures will be implemented.

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

AQ-7 The placement of the source testing ports shall be as specified in 40 CFR Part 60, Appendix A, Method 1. A source test protocol shall be submitted to the District for approval the Air Pollution Control Officer (APCO), at least 45 days prior to conducting the annual source tests. The District shall be notified at least 10 days prior to actual source testing.

Verification: The project owner shall supply diagrams of the proposed source testing port design and location for approval at least 30 days before erecting the HRSG stacks. The project owner shall provide a source test plan to the CPM and District for approval 45 days prior to testing. The project owner shall notify the CPM and the District 10 days prior to any compliance source test.

AQ-8 Stack gas testing, using EPA, ARB, or other APCO approved methods shall be required on an annual basis for NOx, VOC, and CO on the HRSG stacks and the auxiliary boiler stack. The HRSG stacks and the auxiliary boiler stack shall also be tested for SOx and PM10 emissions during the first year and if requested by the APCO, in subsequent years. The emergency generator and firewater pump engines shall be tested for NOx, SOx, VOC, CO, and PM10 during the first year and thereafter only as requested by the APCO.

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-9 Annual testing of the HRSG stacks shall include quantification of formaldehyde and ammonia (NH_3) emissions for compliance with permit limits. The facility owner/operator shall verify, by continuous recording, the ammonia injection rate to the system. The ammonia source test shall be conducted over the expected operating range of the turbine (including, but not limited to 50%, 75%, and 100% load) to establish the range of ammonia injection rates necessary to achieve NOx emission reductions while maintaining the ammonia slip levels. The source test shall also determine the

correlation between the heat input rates of each gas turbine and ammonia mass emissions.

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing. The proposed ammonia injection/emission rate correlation will be provided to the District and CPM for approval with the ammonia source test report.

AQ-10 The gas turbines, duct burners, and auxiliary boiler shall be fired exclusively on pipeline quality natural gas.

Verification: The project owner shall submit information on the quality and type of fuel used for the gas turbines, duct burners, and auxiliary boiler to the CPM and the APCO in the Quarterly Operation Reports (**AQ-22**).

AQ-11 The annual average sulfur content in the natural gas used at the facility shall be less than or equal to 0.3 grains per 100 SCF. Monthly testing, at the site, using approved methods (i.e., EPA 19 and ASTM D-3246) is required to determine the sulfur content of the natural gas. Pacific Gas and Electric natural gas testing data from Burney will be also be reviewed and provided to the District.

Verification: The project owner shall compile the required data on the sulfur content of the natural gas and submit the information to the CPM and the APCO in the Quarterly Operation Reports (**AQ-22**).

AQ-12 The sulfur content limit in diesel fuel used in the construction equipment and emergency generator and firewater pump engines shall be no more than 15 ppm. Emissions from the two stationary engines mentioned above shall not exceed Ringelmann 0.5 or 10 percent opacity for an aggregate of three minutes in a one-hour period.

Verification: The project owner shall compile the required data on the sulfur content of the diesel fuel and emissions from the emergency generator and firewater pump engines and submit the information to the CPM and the APCO in the Quarterly Operation Reports (**AQ-22**). The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission.

AQ-13 All applicable federal standards and test procedures of Subpart KKKK -- Standards of Performance for Stationary Combustion Turbines shall be met.

Verification: The project owner shall provide copies of all correspondence with U.S.EPA regarding compliance with Subpart KKKK provisions to the District and CPM in the Quarterly Operation Reports (**AQ-22**), and shall integrate required testing procedures into the facility source testing plan (**AQ-8**).

AQ-14 The CTGs shall meet a VOC limit of 2.0 ppmvd with duct burner firing and 1.38 ppmvd without duct burner firing @ 15% O_2 averaged over one hour. Maximum hourly steady state emission limits for each CTG are:

Pounds VOC with Duct Firing	Pounds VOC without Duct Firing
7.2	3.4

Verification: The project owner shall submit to the CPM and APCO CTG source test emissions data demonstrating compliance with this condition as required by condition **AQ-8** and shall provide operating data that establishes ongoing compliance with this condition using a determined relationship with CO emissions, previously approved by the CPM and APCO using source test data, as part of the Quarterly Operation Reports (**AQ-22**).

AQ-15 The CTGs shall meet a NOx limit of 2.0 ppmvd @ 15% O_2 averaged over one hour except during commissioning. Maximum hourly steady state emission limits for each CTG are:

Pounds NOx with Duct Firing	Pounds NOx without Duct Firing
20.7	15.3

Verification: The project owner shall submit to the CPM and APCO CTG continuous emissions monitoring system data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**).

AQ-16 The CTGs shall meet a CO limit of 3.0 ppmvd @ 15% O_2 over a three-hour rolling average except during commissioning. Maximum hourly steady state emission limits for each CTG are:

Pounds CO with Duct Firing	Pounds CO without Duct Firing
18.9	14.0

Verification: The project owner shall submit to the CPM and APCO CTG continuous emissions monitoring system data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**).

AQ-17 The auxiliary boiler shall meet a NOx limit of 15.0 ppmvd @ 3% O_2 over one hour.

Verification: The project owner shall submit to the CPM and APCO auxiliary boiler source test emissions data demonstrating compliance with this condition as required in condition **AQ-8** and shall provide confirmation of normal operations of the boiler as part of the Quarterly Operation Reports (**AQ-22**).

AQ-18 Ammonia slip shall be limited to 5.0 ppmvd @ 15% O_2 over one hour. Formaldehyde emissions will be limited to 0.917 lbs per million standard cubic feet (MMscf) of natural gas. Maximum hourly steady state emission limits for each CTG are:

Pounds NH_3 with Duct Firing	Pounds NH_3 without Duct Firing
19.2	14.2

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**). The project owner shall provide for approval of the CPM and APCO a calculation method to determine the ammonia slip emissions, using source test data,

based on the NOx concentration and the ammonia injection rate; and this calculation shall be revised for approval as necessary after each source test performed under **AQ-9**.

AQ-19 Continuous emission monitoring (CEM) systems shall be installed to sample, analyze, and record NOx, CO, and O_2 concentration in the exhaust gas of both HRSG stacks. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the plant distributed control system (DCS) control room when the level of emissions approaches or exceeds pre-selected limits. Relative accuracy test audits (RATA) shall be conducted annual to verify the performance of the CEM system.

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission to verify the continuous monitoring system is properly installed and operational. Emissions data generated by the CEMS system shall be submitted to the CPM and APCO as part of the Quarterly Operation Reports (**AQ-22**). The RATA test results shall be provided along with the annual source test report as required under **AQ-8**.

AQ-20 The Colusa County APCD shall have remote access to the data logger at the facility to enable District staff to monitor realtime emissions as recorded by the CEMs.

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission to confirm remote access to CEMs data is accessible remotely by Colusa County Air Pollution Control District.

AQ-21 The CEMs shall be installed, calibrated, and operational prior to the first firing of the gas turbines. The commissioning phase of the turbines and heat recovery steam generators without abatement of emissions shall not exceed 500 total hours. All reasonable efforts will be made to shorten the length of time of the commissioning phase. Only one gas turbine may be commissioned at a time. Emissions from the commissioning phase of the turbines and heat recovery steam generators shall accrue toward the quarterly and annual emission limits specified in these conditions.

Verification: The project owner shall provide notification to the District and the CPM of the anticipated dates for installation, calibration, and testing for the CEMS at least 10 days prior to installation. The project owner shall provide a report to the District and CPM for approval demonstrating compliance with CEMS calibration requirements prior to turbine first fire. The project owner shall provide monthly commissioning status reports, which include hours of operation without abatement and associated emissions data.

AQ-22 Quarterly reports of CEM and process data, including startup information, shall be submitted to the District within 10 days after the end of each quarter. Format of the data submission will be determined by the District and may include both electronic spreadsheet and hard copy files.

Verification: The project owner shall submit to the CPM and APCO the CEM audits demonstrating compliance with this condition in Quarterly Operation Reports.

AQ-23 The emissions from the emergency generator and firewater pump engines shall not exceed the hourly limits established in the table below. Total annual operating hours shall not exceed 50 per engine. Testing of these two engines shall not be allowed during gas turbine commissioning and facility startup operations. The generator and firewater pump engines must comply with the Tier rating emissions for their model years.

One-Hour Maximum Emissions (lbs)		
Source	**Generator**	**Fire Pump**
NOx	13.88	1.98
CO	0.32	1.72
VOC	0.15	Incl. in NOx
PM10	0.09	0.10
SO_2	0.01	<0.01

Verification: The project owner shall submit to the CPM and APCO for approval the emergency generator and firewater pump selected manufacturer emissions data and engines specifications demonstrating compliance with this condition at least 30 days prior to installation. The project owner shall provide 12-month rolling engine operating hours data to show compliance with the operating hours restriction limits in this condition as part of the Quarterly Operation Reports (**AQ-22**).

AQ-24 The emission rates from the auxiliary boiler shall not exceed the hourly limits established in the table below. The boiler shall not operate more than 3,744 hours per year.

One-Hour Maximum Emissions (lbs)		
Source		**Auxiliary Boiler**
NOx		0.79
CO		1.61
VOC		0.18
PM10		0.33
SO_2		0.13

Verification: The project owner shall submit to the CPM and APCO for approval the auxiliary boiler selected manufacturer emissions data and specifications demonstrating compliance with this condition and condition **AQ-17** at least 30 days prior to installation. The project owner shall submit to the CPM and APCO auxiliary boiler source test emissions data required under condition **AQ-8** demonstrating compliance with the emission limits for the pollutants included in the source test.

AQ-25 The total emissions from the CTGs and HRSGs shall not exceed those established below for hourly and daily operations.

Maximum Emissions Both Turbines (lbs)		
Pollutant	**1-Hour Emissions**	**24-Hour Emissions**
NOx	666.60	2,994.60
CO	967.00	7,659.00
VOC	55.40	630.60
PM10	40.20	964.80
SO_2	14.80	355.20

Verification: The project owner shall submit to the CPM and APCO CTG and HRSG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**).

AQ-26 The total emissions from the Colusa Power Plant shall not exceed the limits established below.

Quarterly and Annual Estimated Combustion Emissions from CGS Facility					
Pollutant	**1st Quarter Emissions (tons)**	**2nd Quarter Emissions (tons)**	**3rd Quarter Emissions (tons)**	**4th Quarter Emissions (tons)**	**Annual Emissions (tons)**
NOx	45.60	43.62	51.34	44.31	184.87
CO	54.20	52.40	107.06	53.86	267.52
VOCs	12.36	11.69	11.90	11.82	47.77
PM10	35.29	35.39	35.70	35.69	142.08
SO_2	4.05	3.83	3.87	3.87	15.62

Verification: The project owner shall submit to the CPM and APCO plant emissions data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**).

AQ-27 Offsets for the Colusa Generating Station power plant shall be in effect prior to operation of the facility and will not be less than the following amounts at any time. The offsets presented in the table below reflect distance factors and the VOC:NOx interpollutant ratio. All ERCs for PM10 will be provided prior to start of construction activities to offset construction PM10 emissions.

Emission Offsets by Calendar Quarter				
Pollutant in tons	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**
Oxides of nitrogen (NO_2)	50.75	47.01	36.55	53.80
Volatile organic compounds	12.36	11.69	11.90	11.82
Particulate Matter PM10	32.51	30.75	24.09	34.74
Oxides of sulfur (SO_2)	3.50	2.94	1.39	3.85

Verification: At least 30 prior to commencing construction, the project owner shall surrender PM10 ERC certificates in the amounts to offset the emissions shown above to

the District and provide documentation of that surrender to the CPM and APCO. At least 60 days prior to commencing CTG first fire, the project owner shall surrender the remaining ERC certificates to offset the emissions in the amounts shown above, and as required in Condition **AQ-SC7**, to the District and provide documentation of that surrender to the CPM and APCO.

AQ-28 The construction of the facility cannot commence until all construction permits, including the U.S. EPA PSD permit, are obtained.

Verification: The project owner shall keep proof of the project's District air permit and Energy Commission certification including copies of all permit conditions and conditions of certification on site starting at the commencement of construction through the final decommissioning of the project. The project owner shall make the District's permit conditions and conditions of certification available at the project site to representatives of the District, ARB and the Energy Commission for inspection. The project owner shall provide a copy of the U.S. EPA PSD permit to the CPM once it is available.

AQ-29 Total facility emissions of Hazardous Air Pollutants (HAP) shall not exceed 10 tons per year for any single pollutant except ammonia, formaldehyde, and propylene.

Verification: The project owner shall submit to the CPM and APCO a HAPs emissions estimation plan for approval within one year of initiating operation that will consider integrating both emission source test data and recognized HAPs emission factors for the calculation of HAPs emissions. The project owner shall submit to the CPM and APCO emission estimates using the approved emission estimation plan methodology to demonstrate compliance with this condition as part of the Quarterly Operation Reports (**AQ-22**) fourth quarter report.

ACRONYMS

AERMOD	ARMS/EPA Regulatory Model
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
APCO	Air Pollution Control Officer (CCAPCD)
ARB	California Air Resources Board
BACT	Best Available Control Technology
bhp	brake horse power
CCAPCD	Colusa County Air Pollution Control District
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CGS	Colusa Generating Station
CO	Carbon Monoxide
CPM	(CEC) Compliance Project Manager
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
gr	Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound)
HRSG	Heat Recovery Steam Generator
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSR	New Source Review
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PM10	Particulate Mater less than 10 microns in diameter
PM2.5	Particulate Mater less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per cubic meter
VOC	Volatile Organic Compounds

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APPENDIX A

Emissions Reduction Credits

Condition of Certification AQ-SC7
Required Emission Reduction Credits [a]

ERC Certificate Number and Number Reduction Source Location Distance from Project	Pollutant	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)	Annual (lbs)
Stationary Source ERCs						
Highway 70 Industrial Park, LP // Oroville, CA // Butte County [b] (Cert. 08-05-36, 08-05-37, 08-05-39) > 20 < 50 miles	NOx	35,000.0	35,000.0	35,000.0	35,000.0	140,000.0
	VOC	87,500.0	87,500.0	87,500.0	87,500.0	350,000.0
	PM10	33,500.0	33,500.0	33,500.0	33,500.0	134,000.0
	SO_2	0.0	0.0	0.0	0.0	0.0
Jack W. Baber // Sierra Mountain Mills, Camptonville, CA // Yuba County [c] (Cert. ERC-9937006-00T) > 50 miles	NOx	420.0	707.0	641.0	501.0	2,269.0
	VOC	199.0	335.0	304.0	238.0	1,076.0
	PM10	6,034.0	10,156.0	9,218.0	7,201.0	32,609.0
	SO_2	166.0	279.0	254.0	198.0	897.0
Agricultural Burn Cessation ERCs						
Baber Family Trust // Colusa, CA // Colusa County [d] (Cert. 06-01-02-03) < 20 miles	NOx	1,004.8	810.3	324.1	1,102.0	3,241.2
	VOC	908.1	732.4	292.9	996.0	2,929.4
	PM10	1,217.3	981.7	392.7	1,335.1	3,926.8
	SO_2	212.5	171.4	68.6	233.1	685.6
Jack W. Baber and Judith S. Baber // Colusa, CA // Colusa County [d] (Cert. 06-01-02-04) < 20 miles	NOx	2,401.8	1,936.9	774.8	2,634.2	7,747.7
	VOC	2,170.8	1,750.7	700.3	2,380.9	7,002.7
	PM10	2,909.8	2,346.6	938.7	3,191.4	9,386.5
	SO_2	508.1	409.7	163.9	557.2	1,638.9
Estate of Jack W. Baber Jr. // Colusa, CA // Colusa County [d] (Cert. 06-01-02-05) < 20 miles	NOx	848.5	684.3	273.7	930.7	2,737.2
	VOC	767.0	618.5	247.4	841.2	2,474.1
	PM10	1,028.0	829.1	331.6	1,127.5	3,316.2
	SO_2	179.5	144.8	57.9	196.9	579.1
Pixie E. Baber // Colusa, CA // Colusa County [d] (Cert. 06-01-02-05.2) < 20 miles	NOx	809.0	625.5	261.0	887.3	2,582.8
	VOC	731.2	589.7	235.9	802.0	2,358.8
	PM10	980.2	790.5	316.2	1,075.0	3,161.9
	SO_2	171.1	138.0	55.2	187.7	552.0
Jack W. Baber and Judith S. Baber // Colusa, CA // Colusa County [d] (Cert. 06-01-02-06) < 20 miles	NOx	587.8	474.1	189.6	644.7	1,896.2
	VOC	531.3	428.5	171.4	582.7	1,713.9
	PM10	712.2	574.3	229.7	781.1	2,297.3
	SO_2	124.3	100.3	40.1	136.4	401.1
Inez Garrette // Colusa, CA // Colusa County [d] (Cert. 06-01-02-07) < 20 miles	NOx	195.9	158.0	63.2	214.9	632.0
	VOC	177.1	142.8	57.1	194.2	571.2
	PM10	237.4	191.4	76.6	260.4	765.8
	SO_2	41.4	33.4	13.4	45.5	133.7

Jack W. Baber and Judith S. Baber // Colusa, CA // Colusa County [d] (Cert. 06-01-02-08) < 20 miles	NOx	2,083.5	1,680.2	672.1	2,285.1	6,720.9
	VOC	1,883.1	1,518.7	607.5	2,065.4	6,074.7
	PM10	2,524.2	2,035.6	814.3	2,768.5	8,142.6
	SO_2	440.7	355.4	142.2	483.4	1,421.7
Jack W. Baber Jr. // Colusa, CA // Colusa County [d] (Cert. 06-01-02-09) < 20 miles	NOx	1,577.2	1,271.9	508.8	1,729.8	5,087.7
	VOC	1,425.5	1,149.6	459.9	1,563.5	4,598.5
	PM10	1,910.8	1,541.0	616.4	2,095.7	6,163.9
	SO_2	333.6	269.1	107.6	365.9	1,076.2
Davis Ranches // Colusa, CA // Colusa County [d] (Cert. 06-7-2001-1) > 20 miles < 50 miles	NOx	13,034.2	10,511.5	4,204.6	14,295.6	42,045.9
	VOC	11,780.9	9,500.7	3,800.3	12,921.0	38,002.9
	PM10	15,791.4	12,735.0	5,094.0	17,319.6	50,940.0
	SO_2	2,752.2	2,223.6	889.4	3,024.1	8,889.3
Gunnersfield Ent., Inc. // Maxwell, CA // Colusa County [d] (Cert. 06-01-02-02) < 20 miles	NOx	5,616.0	4,529.0	1,811.6	6,159.4	18,116.0
	VOC	5,076.0	4,093.5	1,637.4	5,567.2	16,374.1
	PM10	6,803.9	5,487.0	2,194.8	7,462.4	21,948.1
	SO_2	1,188.0	958.1	383.2	1,303.0	3,832.3
Jon B. Chaney // Maxwell, CA // Colusa County [d] (Cert. 06-01-02-01) < 20 miles	NOx	2,104.1	1,696.9	678.5	2,307.8	6,787.3
	VOC	1,901.8	1,533.7	613.5	2,085.9	6,134.9
	PM10	2,549.3	2,055.8	822.3	2,796.0	8,223.4
	SO_2	445.1	359.0	143.6	488.2	1,435.9
Jack DeWit // Maxwell, CA // Colusa County [d] (Cert. 06-07-02-05) < 20 miles	NOx	1,143.0	921.8	368.7	1,253.7	3,687.2
	VOC	1,033.1	833.2	333.3	1,133.1	3,332.7
	PM10	1,384.8	1,116.8	446.7	1,518.8	4,467.1
	SO_2	241.8	195.0	78.0	265.2	780.0
Jerry Maltby et. al. // Williams, CA // Colusa County [d] (Cert. 06-06-11-01) < 20 miles	NOx	4,522.5	3,647.2	1,458.9	4,960.2	14,588.8
	VOC	4,087.7	3,296.5	1,318.6	4,483.3	13,186.1
	PM10	5,479.2	4,418.7	1,767.5	6,009.5	17,674.9
	SO_2	956.7	771.5	308.6	1,049.3	3,086.1
Keeley Family Limited Partnership // Colusa, CA // Colusa County [d] (Cert. 06-07-06-01) < 20 miles	NOx	1,685.2	1,359.0	543.6	1,848.2	5436.0
	VOC	1,523.1	1,228.3	491.3	1,670.5	4913.3
	PM10	2,041.6	1,646.5	658.6	2,239.2	6585.9
	SO_2	356.5	287.5	115.0	391.0	1149.9
Jim Lagrande // Colusa, CA // Colusa County [e] (Cert. 06-01-03-01) < 20 miles	NOx	1,315.0	1,118.2	567.0	1,448.9	4,449.1
	VOC	1,192.2	1,110.7	634.7	1,312.5	4,250.1
	PM10	1,598.0	1,496.9	864.4	1,758.3	5,717.6
	SO_2	279.0	242.7	119.6	305.5	946.8
Charles Tuttle, Gordon Ranch // Maxwell, CA // Colusa County [e] (Cert. 06-07-02-01) < 20 miles	NOx	1,592.3	1,448.5	789.1	1,750.8	5,580.7
	VOC	1,439.2	1,451.0	951.0	1,586.3	5,427.5
	PM10	1,929.2	1,960.9	1,301.1	2,126.8	7,318.0
	SO_2	336.8	306.0	166.3	370.3	1,179.5

Charles Tuttle, Tenant Ranch // Maxwell, CA // Colusa County [f] (Cert. 06-07-02-03) < 20 miles	NOx	1.6	118.8	352.8	3.2	476.4
	VOC	5.1	210.0	857.5	5.7	1,078.3
	PM10	5.1	292.9	1,095.4	7.9	1,401.3
	SO_2	0.2	24.9	62.2	0.7	88.0
Charles Tuttle, Helphenstine Ranch // Maxwell, CA // Colusa County [g] (Cert. 06-07-02-02) < 20 miles	NOx	0.0	85.8	143.8	2.3	232.0
	VOC	0.0	151.7	254.2	4.1	410.0
	PM10	0.0	211.6	354.5	5.7	571.8
	SO_2	0.0	18.0	30.1	0.5	48.5
Charles Tuttle, Williams Ranch // Maxwell, CA // Colusa County [g] (Cert. 06-07-02-04) < 20 miles	NOx	0.0	60.9	102.1	1.6	164.7
	VOC	0.0	107.7	180.4	2.9	291.0
	PM10	0.0	150.2	251.7	4.1	405.9
	SO_2	0.0	12.8	21.4	0.3	34.5
William Payne // Woodland, CA // Sutter County [d] (Cert. ERC 2001-26) > 20 miles < 50 miles	NOx	1,701.0	1,874.0	3,033.0	1,901.0	8,509.0
	VOC	1,538.0	2,362.0	8,034.0	1,718.0	13,652.0
	PM10	2,061.0	3,240.0	9,931.0	2,303.0	17,535.0
	SO_2	360.0	395.0	489.0	402.0	1,646.0

Source: E&LW, 2006d.

[a] The quantities listed are the certificate totals. The total quantity required for offsetting may be less than the total for each pollutant shown above, and those remaining credits can be retained by the applicant at their discretion after surrendering the amounts required as shown in Condition of Certification AQ-SC7.

[b] These emission reductions were the result of the permanent shutdown of the Louisiana Pacific fiberboard production plant and associated emission sources (hardboard production line, two boilers, etc.) in Oroville.

[c] These emission reductions were the result of the permanent shutdown of two wood-fired boilers at Sierra Mountain Mills.

[d] Agricultural burn cessation crop is rice for these sources.

[e] Agricultural burn cessation crop is rice and wheat for these sources.

[f] Agricultural burn cessation crop is safflower and wheat for this source.

[g] Agricultural burn cessation crop is wheat for these sources.

BIOLOGICAL RESOURCES

John Mathias

SUMMARY OF CONCLUSIONS

The proposed Colusa Generation Station project is located in northern Colusa County. The generation facility portion of the project would be built on grassland habitat that has been used for grazing; however, construction of project linear facilities and other related facilities would impact U.S. Army Corps of Engineers (USACE) jurisdictional waters of the U.S., including areas of freshwater marsh, seasonal wetlands, rice fields, and irrigation ditches. In addition to impacts to wetlands, the project has the potential to have significant impacts on the giant garter snake, protected vernal pool branchiopods, Swainson's hawks, burrowing owls, and other special-status species. The applicant has proposed mitigation measures for impacts to biological resources, and the applicant is in the process of obtaining a USACE permit for impacts to wetlands and Biological Opinions from the U.S. Fish and Wildlife Service (USFWS) and from the National Marine Fisheries Service (NMFS) for potential impacts to species listed under the federal Endangered Species Act. The applicant submitted a wetland delineation and a biological assessment to the USACE, and the USACE initiated Section 7 consultation with the USFWS and with the NMFS on June 13, 2007. The applicant will also need to obtain a consistency determination or Incidental Take Permit from the California Department of Fish and Game. Staff is continuing to consult USACE, USFWS, and California Department of Fish and Game personnel to determine the adequacy of the applicant's proposed mitigation measures for impacts to biological resources. Currently, staff is unable to make a final biological resources recommendation regarding the proposed project.

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from E&L Westcoast's (the applicant) proposal for the construction and operation of the Colusa Generating Station (CGS) project. This analysis is primarily directed toward impacts to state and federally listed species, species of special concern, wetlands, and other areas of critical biological concern. This document presents information regarding the affected biotic community, the potential environmental impacts associated with the construction and operation of the proposed project, and, where necessary, specifies mitigation avoidance and compensation measures to reduce potential impacts to less than significant levels. This document also determines compliance with applicable laws, ordinances, regulations, and standards (LORS), and specifies conditions of certification.

This analysis is based, in part, on information provided in the Application for Certification (E&L 2006a), Applicant's Response to Data Request 1 through 116 (L&W 2007a), site visits on January 25 and February 6, 2007, and discussions with U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and USACE personnel.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL	
Clean Water Act of 1977	Title 33, United States Code, sections 1251-1376, and Code of Federal Regulations, part 30, section 330.5(a)(26), prohibit the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the USACE.
Endangered Species Act of 1973	Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq., designate and provide for the protection of threatened and endangered plant and animal species, and their critical habitat. The administering agency is the USFWS.
Migratory Bird Treaty Act	Title 16, United States Code, sections 703 through 712, prohibit the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS.
Magnuson-Stevens Act as amended in 1996	Title 16 United States Code, section 1855(b), 50 CFR 600.905 – 930, defines Essential Fish Habitat (EFH) for federally managed fish species as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." Requires consultation by a federal agency with National Marine Fisheries Service (NMFS) when a proposed action may adversely affect EFH.
Bald and Golden Eagle Protection Act	Title 16, United States Code, section 668 prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.

STATE	The administering agency for the following state LORS is the California Department of Fish and Game, except for Clean Water Act Section 401 certification, which is administered by the Regional Water Quality Control Board.
California Endangered Species Act (CESA) of 1984	Fish and Game Code sections 2050 through 2098 protect California's rare, threatened, and endangered species.
California Code of Regulations	California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, sections 670.2 and 670.5 list plants and animals of California that are designated as rare, threatened, or endangered.
Fully Protected Species	Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibit the take of animals that are classified as fully protected in California.
Nest or Eggs – Take, Possess, or Destroy	Fish and Game Code section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.

Birds of Prey – Take, Possess, or Destroy	Fish and Game Code section 3503.5 specifically protects California's birds of prey in the orders Falconiformes and Strigiformes by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Nongame Birds – Take or Possession	Fish and Game Code section 3513 protects California's migratory nongame birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.
Significant Natural Areas	Fish and Game Code Sections 1930 et seq. designate certain areas in California such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Native Plant Protection Act of 1977	Fish and Game Code sections 1900 et seq. designate rare, threatened, and endangered plants in the state of California.
Lake and Streambed Alteration Agreement	Fish and Game Code sections 1601/1603 regulate activities by private utilities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit.
Regional Water Quality Control Board	By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.

LOCAL	
Resolution 91-55 A Resolution of the Colusa County Board of Supervisors Adopting Specific Revisions to the Colusa County General Plan Land Use Element	Section 4.03 Upland Conservation is intended to be applied in the mountain and upland foothill areas of the county in which forestry, mining, grazing, and recreation are natural and desirable uses and in which protection of the watershed lands from fire, erosion, pollution, and other detrimental effects is essential to the general welfare. Section 4.15 Open Space is intended to be applied to public forest, scenic, and recreational lands, to wildlife preserves, to regional and local parks, golf courses and other such open areas, and to greenbelt buffers and similar features in urban development.

Colusa County General Plan – Final Conservation and Open Space Elements	The Conservation Element addresses the preservation, management, and utilization of the county's natural resources. It contains provisions for the conservation and protection of forests, water, rivers, soils, minerals, and air, and the preservation of agricultural uses, wildlife, and fisheries. Issues covered by the conservation element are: landform and physiology; soils and geology; water and water quality; air and air quality; vegetation; wildlife refuges; fish and wildlife; agriculture; timber; minerals; geothermal energy; natural gas; and cultural resources. The Open Space Element is necessary to ensure that land will remain available for the production of food, the management of natural resources, the enjoyment of scenic beauty, and recreation. Open space is not a land use, but a characteristic of the certain types of land uses. The focus of the open space element is on the subject of outdoor recreation as it pertains to serving small communities, the larger county population, and an even larger regional population.

SETTING

REGIONAL SETTING

The site of the proposed CGS is located in northern Colusa County on the west side of the Sacramento Valley near the southern end of the Mendocino National Forest and the foothills of the Coast Range. The Sacramento River meanders through the county and forms part of the county line between Colusa and Sutter Counties. Colusa County is located within the Pacific Flyway, a major north-south route for migratory birds.

The Sacramento National Wildlife Refuge (NWR) and Delevan NWR are located approximately 6 miles east and 10 miles southeast of the project site, respectively. The refuges provide habitat for migratory waterfowl and a wide variety of other wildlife. The Sacramento NWR was created in 1937 and encompasses 10,783 acres. The refuge contains seasonal wetlands, irrigated moist soil units, permanent ponds, and uplands. Delevan NWR was authorized in 1962 under the Migratory Bird Conservation Commission and encompasses 5,794 acres. The refuge contains permanent ponds, seasonal wetlands, watergrass fields, and uplands. Sacramento NWR and Delevan NWR are part of the Sacramento National Wildlife Refuge Complex, which is used by more than 300 species of resident and migrant bird and mammal species.

The predominant natural vegetation communities in the project area are grasslands, oak woodlands, riparian forests, and vernal pools. Cropland occupies about 235,000 acres, or about one third of Colusa County's total land area. Ranches occupy about 200,000 acres, just over one quarter of the county's land area.

PROJECT, SITE, AND VICINITY DESCRIPTION

The applicant proposes to build the CGS on a 100-acre parcel located approximately 0.5 mile east of the Tehama-Colusa Canal and approximately 0.75 mile west of the Glenn-Colusa Canal. The Tehama-Colusa Canal is part of the Central Valley Water Project. It is concrete-lined and bordered by gravel roads on both sides. It originates at the Red Bluff Diversion Dam in Redding and extends south for 111 miles. The Glenn-Colusa Canal, which begins at Hamilton City, is maintained by the Glenn-Colusa Irrigation District and parallels the Tehama-Colusa Canal. The Glenn-Colusa Canal is bounded by earthen levees and provides somewhat better habitat for aquatic and avian species than does the Tehama-Colusa Canal. Both canals receive most of their water from the Sacramento River.

Habitat on the proposed power plant site is primarily annual grassland, but an area of alkali grassland is located in the southwest corner of the site. To the east and northeast of the proposed site and the existing PG&E compressor station is a complex of vernal pools and vernal pool grassland habitat. In addition, several stock ponds are in the project vicinity (E&L 2006a). The area between Interstate 5 and the proposed site is primarily rice and wheat fields, including a network of irrigation canals.

The power generation facility and stormwater detention basin will occupy 22.5 acres of annual grassland habitat. Other components of the CGS project include an 8.2-acre switchyard immediately north of the new power plant site, a 43-acre construction laydown area, a water intake structure at the Tehama-Colusa Canal, a 2,700-foot-long water supply pipeline, a service road adjacent to the water supply pipeline, an 1,800-foot-long electrical interconnection to PG&E's existing Cottonwood to Vaca-Dixon transmission lines, a 1,500-foot-long natural gas pipeline, a 2,500-foot-long access road to the project site, realignment of a portion of Dirks Road, a replacement bridge across the Glenn-Colusa Canal, replacement of the Teresa Creek Bridge on McDermott Road, and roadway improvements and widening at the intersection of Delevan and McDermott Roads (E&L 2006a, p. 1-2).

Biological Resources Table 1 is a list of special-status species known to occur or with the potential to occur in the project vicinity. The term "special-status species" includes state and federally listed species and species proposed for listing under the California and federal Endangered Species Acts, state species of special concern, and plant species designated as rare, threatened, or endangered (classified as List 1B or List 2) by the California Native Plant Society (CNPS).

BIOLOGICAL RESOURCES Table 1
Special-Status Species with Potential to Occur in the Project Area
(E&L 2006a, pp. 8.2-61 to 8.2-73)

Common Name	Scientific Name	Status (Federal/State/ CNPS)	Notes on Occurrence(s)
Plants			
Hoover's spurge	*Chamaesyce hooveri*	FT/ --/1B	Potential to occur
Vernal pool smallscale	*Atriplex persistens*	--/--/1B	Potential to occur
Heckard's peppergrass	*Lepidium latipes* var. *heckardii*	--/--/List 1B	Potential to occur
Hairy Orcutt grass	*Orcuttia pilosa*	FE/SE/ List 1B	Potential to occur
Adobe lily	*Fritillaria pluriflora*	--/--/ List 1B	Potential to occur
Diamond-petaled Cal. poppy	*Eschscholzia rhombipetala*	--/--/ List 1B	Not likely to occur
San Joaquin spearscale	*Atriplex joaquiniana*	--/--/ List 1B	Potential to occur
Brittlescale	*Atriplex depressa*	--/--/ List 1B	Potential to occur
Heartscale	*Atriplex cordulata*	--/--/ List 1B	Potential to occur
Bent-flowered fiddleneck	*Amsinckia luncaris*	--/--/ List 1B	Not likely to occur
Ferris' milk-vetch	*Astragalus tener* var. *ferrisiae*	--/--/ List 1B	Potential to occur
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	FE/SE/ List 1B	Potential to occur
Recurved larkspur	*Delphinium recurvatum*	--/--/ List 1B	Potential to occur
Round-leaved filaree	*Erodium macrophyllum*	--/--/ List 2	Potential to occur
Coulter's goldfields	*Lasthenia glabrata* ssp. *coulteri*	--/--/ List 1B	Potential to occur
Heckard's peppergrass	*Lepidium latipes* var. *heckardi*	--/--/ List 1B	Potential to occur
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	--/--/ List 1B	Potential to occur
Colusa grass	*Neostapfia colusana*	FT/SE/ List 1B	Not likely to occur
Caper-fruited tropidocarpum	*Tropidorcarpum capparideum*	--/--/ List 1B	Not likely to occur
Greene's tuctoria	*Tuctoria greenei*	FE/CR/ List 1B	Potential to occur
Invertebrates			
Conservancy fairy shrimp	*Branchinecta conservatio*	FE/--	Potential to occur
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT/--	Potential to occur
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE/--	Potential to occur
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT/--	Not likely to occur
Fish			
Delta smelt	*Hypomesus transpacificus*	FT/ST	Not likely to occur
Winter-run chinook salmon	*Oncorhynchus tshawytscha*	FE/SE	Potential to occur
Spring-run chinook salmon	*Oncorhynchus tshawytscha*	FT/ST	Potential to occur
Fall/late-fall run chinook salmon	*Oncorhynchus tshawytscha*	FC/CSC	Potential to occur
Central Valley steelhead	*Oncorhynchus mykiss*	FT/--	Observed in Teresa Creek
Amphibians			
California red-legged frog	*Rana draytonii*	FT/CSC	Not likely to occur
California tiger salamander	*Ambystoma californiense*	FT/CSC	Not likely to occur
Reptiles			
Giant garter snake	*Thamnophis gigas*	FT/ST, CFP	Likely to occur in rice fields and irrigation ditches in project vicinity
Birds			
White-faced ibis	*Plegadis chihi*	--/CSC	Observed in project vicinity
White-tailed kite	*Elanus leucurus*	--/CFP	Potential to occur

Common Name	Scientific Name	Status (Federal/State/ CNPS)	Notes on Occurrence(s)
Bald eagle	*Haliaeetus leucocephalus*	FT/SE, CFP	Potential to occur
Swainson's hawk	*Buteo swainsoni*	--/ ST	Foraging Habitat
Western burrowing owl	*Athene cunicularia hypugea*	--/CSC	Known to occur in project vicinity
Northern spotted owl	*Strix occidentalis caurina*	FT/--	Not likely to occur
Least bell's vireo	*Vireo bellii pusillus*	FE/SE	Not likely to occur
Golden eagle	*Aquila chrysaetos*	--/CSC	Potential to occur
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FC/SE	Not likely to occur
Osprey	*Pandion haliaetus*	--/CSC	Not likely to occur
Bank swallow	*Riparia riparia*	--/ST	Not likely to occur
Tricolored blackbird	*Agelaius tricolor*	--/CSC	Potential to occur
Mammals			
Townsend's western big-eared bat	*Corynorhinus townsendii*	--/CSC	Potential to occur
Pale big-eared bat	*Corynorhinus townsendii pallescens*	--/CSC	Potential to occur
Pallid bat	*Antrozous pallidus*	--/CSC	Potential to occur

FE: Federally listed endangered
FT: Federally listed threatened
FPE: Federally proposed for listing as endangered
FPT: Federally proposed for listing as threatened
FPD: Federally proposed for Delisting
FC: Candidate for Listing as threatened or endangered
SE: State-listed endangered
ST: State-listed threatened
SCE: State candidate for listing as endangered
SCT: State candidate for listing as threatened
CSC: California species of special concern
CFP: California fully protected species
CR: California rare
List 1A: Presumed extinct
List 1B: CNPS rare or endangered in California and elsewhere
List 2: CNPS rare or endangered in California, more common elsewhere

Power Plant Site

Construction of the CGS power generation facility, switchyard, and stormwater basin would permanently impact approximately 30.7 acres. The power generation facility and switchyard would occupy 20 acres, the switchyard would occupy 8.2 acres, and the stormwater basin would occupy 2.5 acres. The temporary construction area, including the laydown area, construction parking areas, and construction offices, would temporarily impact approximately 43 acres (E&L 2006a, p. 3-45, 46). The proposed power plant will use dry cooling technology for its operation and will employ a zero liquid discharge system. There will be no cooling towers or evaporation ponds on site. The power plant site and temporary construction areas are currently annual grassland habitat that has been used for grazing cattle and is characterized by gently rolling hills typical of the transition area between the valley floor and low Coast Range foothills.

Annual grassland and alkali grassland are the two habitat types that are located on the project site. The majority of the site is annual grassland dominated by nonnative plant species that are typical of grasslands in the Central Valley that have been degraded by grazing. Dominant grassland plant species include yellow star thistle (*Centaurea solstialis*), medusa head (*Taeniathernum caputmedusae*), wild oats (*Avena* spp.), ripgut brome (*Bromus diandrus*), filaree (*Erodium botrys*), and geranium (*Geranium dissectum*). The project site provides habitat for a variety of wildlife species, including western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), and coyote (*Canis latrans*) (E&L 2006a, p. 8.2-2, 3). Alkali grassland in the southwestern portion of the project site is characterized by low-growing vegetation (E&L 2006a, p. 8.2-3).

Linear Facilities

Transmission Lines

The project will include construction of an 1,800-foot-long electrical interconnection with PG&E's 230-kV Cottonwood to Vaca-Dixon transmission line located east of the project site. Twelve double-circuit lattice steel transmission towers will be constructed to accommodate the four separate interconnections between the CGS and the 230-kV line. Each of the twelve towers will have a temporary disturbance area of about 10,000 square feet and permanent disturbance of approximately 1,600 square feet. The towers will permanently disturb approximately 0.3 acres and temporarily disturb 7.3 acres of annual grassland (E&L 2006a, pp. 3-47; 5-1). One of the new transmission line towers will be located in the vicinity of vernal pools that have been identified by the applicant (E&L 2006a, p. 5-1).

Roads

The route from Interstate 5 to the site follows existing paved roads (Delevan, McDermott, and Dirks Roads) that terminate at the PG&E compressor station. Irrigation ditches parallel portions of Delevan, McDermott, and Dirks Roads. Rice fields are the primary land use along the roads and serve as habitat for the state and federally threatened giant garter snake and for birds such as ibis, egrets, and herons. A new access road will extend west approximately 2,700 feet from the existing PG&E compressor station to the proposed plant site. This new permanent paved access road will be 30 feet wide, will temporarily disturb approximately 4.1 acres, and will permanently disturb approximately 1.7 acres. The plant perimeter road, parking areas, and miscellaneous internal access roads will also be paved (E&L 2006a, p. 3-16, 3-47).

Natural Gas Line

The natural gas pipeline will be approximately 1,500 feet long and will interconnect to PG&E's existing gas lines. The pipeline would be constructed in annual grassland habitat and construction would temporarily disturb an area of approximately 1.7 acres along the pipeline route (E&L 2006a, p. 3-47, 6-1).

Water Supply Pipeline

The water pipeline will be constructed to supply water for process, service, and potable needs. The pipeline will be approximately 2,700 feet in length and will connect with the

Tehama-Colusa Canal west of the site. A permanent 12-foot-wide dirt access road will be constructed parallel to the water supply pipeline. The water supply pipeline and access road will be constructed in annual grassland habitat.

Delevan/McDermott Intersection

The primary vehicular access to the site from Interstate 5 is via Delevan Road, McDermott Road, and Dirks Road. The intersection at Delevan and McDermott Roads would need to be widened on the northeast and southeast corners to provide a larger turning radius for heavy-haul vehicles. Irrigation canals and rice fields adjacent to the intersection serve as giant garter snake habitat.

Teresa Creek Bridge

Replacement of the Teresa Creek Bridge on McDermott Road will be necessary to allow trucks with heavy loads to access the project site. Replacement of the bridge will entail one of two options. One option would be to install a temporary bridge to the east of the existing bridge prior to replacement of Teresa Creek Bridge. The second option would be to detour traffic using McDermott Road to an alternate route during construction of the new bridge (E&L 2006a, p. 3-20, 3-21). Teresa Creek is bordered on either side by a band of seasonal wetlands, and the creek may provide habitat for special-status fish species including salmon and steelhead.

Glenn-Colusa Canal Bridge Replacement and Road Realignment

Construction of a new bridge over the Glenn-Colusa Canal and realignment of Dirks Road will be necessary to allow trucks with heavy loads to access the project site. The new bridge will be constructed approximately 20 to 40 feet north of the existing Glenn-Colusa Canal Bridge (E&L 2006a, p. 3-21). The road on either side of the new bridge will be realigned. The existing bridge will be left in place or its deck may be removed (E&L 2006a, p. 3-21). Rice fields, irrigation ditches, freshwater marsh, and upland areas will be impacted by the bridge replacement and road realignment (E&L 2006a, p. 8.2-77).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

Significance of impacts may sometimes be determined by compliance with applicable laws, ordinances, regulations, and standards (LORS). Agencies may also adopt “thresholds” to determine impact significance. Even in the absence of such LORS or “thresholds,” the opinion of biological experts can support a finding of significance.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Permanent and Temporary Habitat Impacts

Grassland Habitat

Construction of the CGS will cause temporary and permanent impacts to grassland habitat. The following species may forage on grassland habitat in the project area:

- bald eagle (*Haliaeetus leucocephalus*),
- northern harrier *(Circus cyaneus)*,
- Swainson's hawk (*Buteo swainsoni*),
- ferruginous hawk *(Buteo regalis)*,
- western burrowing owl (*Athene cunicularia hypugea)*,
- California horned lark *(Eremophila alpestris)*, and
- tricolored blackbird (*Agelaius tricolor).*

Permanent impacts to grassland habitat due to construction of the power generation facility, switchyard, stormwater basin, plant access road, transmission line interconnection, and water supply pipeline road would amount to approximately 33.4 acres. An additional 55.3 acres of grassland habitat would be temporarily disturbed during construction (E&L 2006a, pp. 3-47, 3-48).

CDFG's draft Swainson's hawk mitigation report (CDFG 1994) outlines mitigation recommendations for loss of Swainson's hawk foraging habitat, such as the grassland habitat that will be lost by construction of the CGS. The Swainson's hawk is listed as threatened under the California Endangered Species Act. The CDFG report recommends mitigation for loss of foraging habitat based on the distance of the project to the nearest Swainson's hawk nest. CDFG's mitigation guidelines recommend that projects within 1 mile of an active nest tree provide habitat management lands at a ratio of 1 acre provided for every acre lost (1:1 – or 0.5:1 if the lands are actively managed for prey production), projects within five miles of an active nest tree provide habitat management lands at a 0.75:1 ratio, and projects within 10 miles of an active nest tree provide habitat management lands at a 0.5:1 ratio. Swainson's hawk nests have been documented within 5 miles of the CGS site; however, surveys conducted by the applicant did not reveal nest sites within 1 mile of the project site (E&L 2006a, pp. 8.2-24, 8.2-35).

The applicant has indicated that temporary construction areas will be revegetated using an erosion-control seed mix (L&W 2007a, p. 62-2) and returned to grazing land after construction (E&L 2006a, p. 3-17), thereby mitigating impacts to Swainson's hawks due to temporary habitat impacts. The applicant has proposed preservation of mitigation lands for permanent loss of Swainson's hawk foraging habitat at a ratio of 0.75 acres for every acre developed. The applicant has also proposed conducting additional preconstruction surveys to determine whether Swainson's hawk nests exist within 1 mile of the CGS site (E&L 2006a, p. 8.2-36). If Swainson's hawk nest do exist within 1 mile

of the CGS site, staff would require a 1:1 mitigation ratio, in accordance with the recommendations of CDFG's mitigation report.

The applicant has proposed mitigating for the permanent loss of 31.75 acres of Swainson's hawk foraging habitat at a 0.75:1 ratio, resulting in the offsite preservation of 23.81 acres of habitat (E&L 2006a, p. 8.2-36); however, figures in AFC Table 3.6-3 (E&L 2006a, pp. 3-47, 3-48) indicate that 33.4 acres of land would be permanently impacted due to construction of the power generation facility, switchyard, stormwater basin, plant access road, transmission line interconnection, natural gas pipeline, and water supply pipeline and associated unpaved road. All of these facilities will be constructed on potential Swainson's hawk foraging habitat. Staff proposes that the applicant provide at least 25.05 acres (33.4 acres x 0.75 mitigation ratio) of offsite Swainson's hawk foraging habitat to mitigate for the loss of 33.4 acre of foraging habitat due to construction of the CGS.

Condition of Certification **BIO-20** requires the implementation of Swainson's hawk mitigation measures and requires habitat compensation for permanent impacts to Swainson's hawk foraging habitat.

Wetlands

Impacts to waters of the U.S., including wetlands, are regulated by the U.S. Army Corps of Engineers (USACE). Wetlands under the jurisdiction of the USACE in the project area include vernal pools, seasonal wetlands, freshwater marsh, and cultivated rice fields. The applicant has submitted a wetland delineation to the USACE and has submitted an Individual Permit Application to the USACE for fill of wetlands and nonwetland waters of the United States (URS 2007h).

Vernal Pools

Construction of the CGS could impact vernal pools, seasonal wetlands, and freshwater marsh wetlands in the project vicinity. The applicant identified wetlands in the project area and potential impacts to wetlands in the April 2007 Draft Jurisdictional Delineation and in the Draft U.S. Army Corps of Engineers Permit Application (URS 2007h).

Vernal pools are located in the vicinity of the transmission line interconnection and on either side of Dirks Road west of the Glenn-Colusa Canal. Although construction will not directly impact vernal pools, indirect impacts to vernal pools could occur since construction will occur in close proximity to vernal pools. The applicant has proposed to avoid impacts to vernal pools (E&L 2006a, p. 8.2-34) by:

- avoiding ground-disturbing activities within 250 feet of vernal pools;
- constructing near vernal pools during the dry season to reduce potential impacts;
- establishing 250-foot buffer zones, to be marked by qualified biologists;
- using only rubber-tired vehicles within buffer zones;
- prohibiting access of vehicles and personnel within wetland boundaries of vernal pools;

- using straw wattles or silt fences to prevent sediment from reaching vernal pools; and
- restoring temporarily impacted areas to approximate original site conditions.

Staff agrees with the applicant's proposed mitigation measures. Condition of Certification **BIO-13** requires the implementation of measures to avoid wetland loss and impacts to wetlands. In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3 BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to vernal pools are mitigated to less than significant levels.

Condition of Certification **BIO-1** requires that the project owner retain a Designated Biologist with specific qualifications. Condition of Certification **BIO-2** outlines duties that will be required of the Designated Biologist. Condition of Certification **BIO-3** describes the qualifications necessary for any Biological Monitor(s). Condition of Certification **BIO-4** outlines the authority of the Designated Biologist and the Biological Monitor. These conditions of certification are necessary because it is important to have qualified personnel who are responsible for ensuring that the mitigation measures discussed are implemented correctly.

Condition of Certification **BIO-5** requires the implementation of a Worker Environmental Awareness Program (WEAP). A WEAP is necessary to ensure that personnel working on the project do not cause additional, unnecessary impacts. Condition of Certification **BIO-6** requires the preparation of a Biological Resources Management, Implementation, and Monitoring Plan (BRMIMP) and the implementation of measures identified in the BRMIMP. The BRMIMP will describe how the project owner will implement the mitigation measures discussed.

Seasonal Wetlands, Freshwater Marsh Wetlands, and Cultivated Rice Fields

Seasonal wetlands in the project area are located on the south side of Dirks Road west of the Glenn-Colusa Canal and along the banks of Teresa Creek in the vicinity of the Teresa Creek Bridge. Construction in the vicinity of the Glenn-Colusa Canal would temporarily impact 0.052 acres of seasonal wetlands, and construction of the Teresa Creek Bridge would temporarily impact 0.023 acres of seasonal wetlands. There would be no permanent impacts to seasonal wetlands due to the project construction.

Freshwater marsh wetlands are located along Dirks Road west of the Glenn-Colusa Canal and along either side of Glenn-Colusa Canal north and south of Dirks Road (URS 2007h, fig. 6). The construction of the new bridge over the Glenn-Colusa Canal and associated realignment of Dirks Road would permanently impact 0.112 acres of freshwater marsh and temporarily impact 0.107 acres of freshwater marsh (URS 2007h, p. 7).

Construction of the new bridge over the Glenn-Colusa Canal and the associated road realignment would permanently impact 0.323 acres of rice fields and temporarily impact 0.164 acres of rice fields. Teresa Creek Bridge construction would temporarily impact 0.107 acres of rice fields.

The applicant has proposed compensatory offsite mitigation for permanent impacts to 0.112 acres of freshwater marsh at a 3:1 ratio and for permanent impacts to 0.323 acres of rice fields at a 1:1 ratio (URS 2007h, p. 10). The proposed impact compensation ratios result in a total of 0.659 acres of proposed wetland mitigation acreage. The AFC states that offsite mitigation would be through the Dolan Ranch Conservation Bank in Colusa County or at another option approved by the U.S. Fish and Wildlife Service (E&L 2006a, p. 8.2-33).

Mitigation for temporary impacts to seasonal wetlands, freshwater marsh, and rice fields would be at a 1:1 ratio and would be in the form of onsite restoration and revegetation of affected areas (URS 2007h, p. 10). The applicant has proposed revegetation of temporarily disturbed areas with appropriate native species and in accordance with USFWS restoration guidelines (E&L 2006a, p. 8.2-23; L&W 2007a, p. 62-3).

Staff agrees with the applicant's proposed mitigation measures; implementation of the proposed mitigation measures will ensure that impacts to seasonal wetlands, freshwater marsh, and cultivated rice fields are less than significant. Condition of Certification **BIO-17** requires that the project owner submit a revegetation and restoration plan prior to site mobilization, and Condition of Certification **BIO-19** requires offsite mitigation for permanently impacted wetlands. The USACE will make a final determination as to the amount of wetland mitigation required in its Section 404 permit. Conditions of Certification **BIO-12** and **BIO-6** require that the project owner comply with the terms and conditions of the USACE Clean Water Act Section 404 permit.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to wetlands are mitigated to less than significant levels.

Nonwetland Waters of the United States

The USACE also regulates impacts to nonwetland waters of the U.S. Nonwetland waters of the U.S. are any waters that are under the jurisdiction of the USACE but are not wetlands. Nonwetland waters of the U.S. that may be impacted by the project include Teresa Creek, the Glenn-Colusa Canal, and irrigation ditches. Replacement of the Teresa Creek Bridge would permanently fill 0.014 acres of non-wetland waters of the U.S. and would temporarily impact 0.040 acres of nonwetland waters of the U.S. Replacement of the Glenn-Colusa Canal Bridge and Dirks Road realignment would permanently fill 0.161 acres of nonwetland waters of the U.S. and temporarily impact 0.283 acres of nonwetland waters of the U.S. (URS 2007h, pp. 10, 11). Glenn-Colusa Canal would not be impacted by the project, but irrigation ditches along Dirks Road would be impacted.

As discussed earlier, the applicant has submitted an Individual Permit Application to the USACE for fill of wetlands and nonwetland waters of the U.S. The applicant's permit application states that impacts to nonwetland waters of the U.S. will be mitigated through onsite, in-kind replacement (URS 2007h, pp. 10, 11). The applicant will also be required to obtain a Streambed Alteration Agreement from CDFG.

Implementation of the applicant's proposed mitigation measures, compliance with the terms and conditions of the USACE Individual Permit, and compliance with the terms

and conditions of the Streambed Alteration Agreement will ensure that impacts to nonwetland waters of the U.S. are less than significant. Condition of Certification **BIO-12** requires that the applicant obtain a Section 404 permit and requires that biological resources-related terms and conditions of the permit are incorporated into the BRMIMP. Condition of Certification **BIO-9** requires that the project owner acquire a Streambed Alteration Agreement and incorporate the biological resources-related terms and conditions into the project's BRMIMP. Condition of Certification **BIO-18** requires the implementation of a revegetation and restoration plan.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to nonwetland waters are less than significant.

Impacts to Special-Status Species

Special-Status Plants

Rare plant surveys were conducted at the project site on March 26 and 27, April 23, and May 11, 2001, and April 5, August 24, September 22, and October 10, 2006. The majority of the special-status plant species in the project area are associated with wetland habitats. **Biological Resources Table 1** lists special-status plants that have the potential to occur in the project area. Construction of the CGS has the potential to cause indirect impacts to the plant species identified in **Biological Resources Table 1**; however, the only special-status plant species that was observed during surveys at the project site was brittlescale (*Atriplex depressa*), a California Native Plant Society List 1B species. List 1B species are those that are rare, threatened, or endangered in California and elsewhere. Brittlescale observed during site surveys was located in the vernal pool complex to the north and east of the site. Brittlescale would not be impacted directly by construction; however, it is possible that indirect impacts would occur (E&L 2006a, p. 8.2-34).

The applicant has proposed mitigation measures to avoid indirect impacts to brittlescale and other special-status plants that may exist in the area, including the establishment of buffer zones around special-status plant locations, fencing around special-status plants, employment of measures to avoid sedimentation, and revegetation of temporarily disturbed areas.

Staff agrees with the applicant's proposed mitigation measures. Staff's proposed Condition of Certification **BIO-18** requires the implementation of a revegetation and restoration plan for temporarily impacted habitat and Condition of Certification **BIO-13** requires the implementation of measures to avoid wetland loss and to avoid impacts to wetlands. Implementation of these conditions of certification will ensure less-than-significant impacts to special-status plant species.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to special-status plants are mitigated to less than significant levels.

Special-Status Branchiopods (Freshwater Crustaceans)

The project has the potential to impact the federally endangered Conservancy fairy shrimp (*Branchinecta conservatio*), the federally threatened vernal pool tadpole shrimp *(Lepidurus packardi*), and the federally threatened vernal pool fairy shrimp *(Branchinecta lynchi)*. The applicant did not conduct focused surveys for branchiopods but has assumed the presence of vernal pool fairy shrimp and vernal pool tadpole shrimp based on known occurrences of these species in the study area (E&L 2006e, p. 6). These species may be present in vernal pool habitat in the project vicinity. Both temporary and permanent impacts to vernal pool habitat would result in a significant adverse impact to invertebrates. Although direct impacts to branchiopods are not expected, indirect impacts could occur if the construction activities impact vernal pool habitat. Mitigation measures for potential impacts to vernal pools discussed earlier, including measures discussed in Condition of Certification **BIO-13**, would mitigate potential impacts to vernal pool branchiopods to less than significant levels. The USFWS Biological Opinion may require additional measures to mitigate potential impacts to listed branchiopods.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to special-status branchiopods are mitigated to less than significant levels.

Special-Status Fish

The National Marine Fisheries Service (NMFS) classifies salmon into evolutionarily significant units (ESUs). An ESU is a subportion of a species population that is defined by substantial reproductive isolation from other conspecific units and represents an important component of the evolutionary legacy of the species. ESUs are often referred to as "runs." Factors used in determining an ESU include spatial, temporal, and genetic isolation, maturation rates, and other life history traits. Three chinook salmon (*Oncorhynchus tshawytscha*) ESUs occur in the Sacramento River: the Central Valley spring run ESU, Central Valley fall/late-fall run ESU, and the Sacramento Valley winter run ESU. In addition, the Central Valley steelhead (*Oncorhynchus mykiss*) ESU occurs in the Sacramento River and San Francisco Bay (E&L 2006a).

The Sacramento River and its tributaries are considered critical habitat for the Central Valley spring run and Central Valley fall/late-run chinook salmon ESUs. Teresa Creek is a tributary to Hunter's Creek, which is a tributary to the Sacramento River. Use of culverts during construction of the Teresa Creek Bridge could create a barrier to migration. In addition, if a cofferdam is needed during bridge construction, direct impacts to salmonids could occur. Loss of creekside vegetation during construction could indirectly affect salmonids.

The applicant has proposed mitigation measures to mitigate potential impacts to salmonids due to construction of the Teresa Creek Bridge. To minimize potential impacts to salmonids, the applicant has stated that culverts installed will be large enough to maintain peak flows, that screens will be used to prevent fish from being drawn into pumps, and that a biologist will be present if dewatering of any area is necessary during construction. Disturbed vegetation along Teresa Creek will also be restored after construction.

Staff agrees with the proposed mitigation measures. Condition of Certification **BIO-18** requires the implementation of a revegetation and restoration plan to restore temporarily disturbed habitat, and Condition of Certification **BIO-17** requires that the applicant implement measures to minimize impacts to fish species during construction at Teresa Creek. The USACE has initiated Section 7 consultation with the NMFS for potential impacts to listed salmonids and critical habitat. Condition of Certification **BIO-21** requires incorporation of the terms and conditions of the NMFS Biological Opinion into the project's BRMIMP.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to special-status fish are mitigated to less than significant levels.

Special-Status Amphibians

The project has the potential to impact the California tiger salamander *(Ambystoma californiense)* and the California red-legged frog (*Rana draytonii).*

The California tiger salamander is a federally threatened species. Its habitat is restricted to vernal pools and seasonal ponds, including many constructed stockponds, in grassland and oak savannah plant communities from sea level to about 1,500 feet in central California. In the coastal region, populations are scattered from Sonoma County in the northern San Francisco Bay Area to Santa Barbara County, and in the Central Valley and Sierra Nevada foothills from Yolo to Kern Counties (USFWS web site). It is unlikely that the California tiger salamander would be impacted by the CGS because there are no known occurrences of the species in the project area within the past 40 years (E&L 2006a, p. 8.2-16).

The California red-legged frog is a federally threatened species that occurs primarily in ponds or pools of streams. The project site is within the historic range of the California red-legged frog; however, it is not believed to currently exist in the project area. The species has been extirpated from 70 percent of its former range and now is found primarily in coastal drainages of central California, from Marin County, California, south to northern Baja California, Mexico, and in isolated drainages in the Sierra Nevada, northern coast, and northern Transverse Ranges (USFWS 2002).

Because the California tiger salamander and California red-legged frog are not known to currently exist in the project area, impacts to these species are unlikely; however, the applicant has proposed measures that would be implemented in the event that the species is observed by project biologists or construction personnel during construction of the CGS (E&L 2006a, p. 8.2-38, 8.2-39). Mitigation measures proposed by the applicant include consultation with USFWS if individuals are found on the project site, inspection of trenches during construction, training construction personnel on species identification, regular disposal of trash, and timing construction to occur during the nonbreeding season.

Staff agrees with the applicant's proposed mitigation measures. Condition of Certification **BIO-2** requires that the Designated Biologist or Biological Monitor mark sensitive biological resource areas, inspect active construction areas for animals that may be in harm's way, and implement a WEAP, among other things. Condition of

Certification **BIO-5** also requires the development and implementation of a WEAP to educate workers about avoidance of impacts to sensitive species and other biological resources. Condition of Certification **BIO-14** prohibits the use of chemicals harmful to amphibians.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-3**, **BIO-4**, and **BIO-6** are necessary to ensure that impacts to special-status amphibians are mitigated to less than significant levels.

Special-Status Reptiles

Giant garter snake

Giant garter snakes are listed as threatened under the federal and state endangered species acts. Giant garter snakes utilize aquatic habitats such as rice fields, canals, and irrigation ditches that are prevalent in the project area during the spring-through-fall active season. During its winter dormancy period, giant garter snakes typically occupy small mammal burrows and soil crevices.

The USFWS 1999 *Draft Recovery Plan for the Giant Garter Snake (Thamnophis gigas)* outlines the species' life history, habitat needs, distribution, and recovery strategy. Habitat loss and fragmentation, flood-control activities, changes in agricultural and land-management practices, predation from introduced species, parasites, and water pollution are all threats to the giant garter snake (USFWS 1999). Protection of existing habitat is one of the key components for the recovery strategy for this species. Existing giant garter snake habitat in Colusa County includes marshes, wetlands, and rice fields. The draft recovery plan outlines conservation objectives for private property and public property including the Colusa Basin and the Sacramento Wildlife Refuge Complex (USFWS 1999).

Impacts to a small amount of giant garter snake habitat will occur at the Delevan Road / McDermott Road intersection. Gravel will be placed on the east side of Delevan Road north and south of the intersection, potentially impacting burrows and crevices used by giant garter snakes. The Teresa Creek Bridge replacement will impact rice fields and other aquatic habitat that may be used by giant garter snakes. Construction of the new Glenn-Colusa Canal Bridge and the access road to the CGS site will also impact potential giant garter snake habitat, including irrigation ditches, freshwater marsh, rice fields, and associated upland habitat. Increased traffic due to construction of the CGS could have a significant adverse impact on individual snakes from road kills. Snakes may cross the road and may use it as a basking surface during the active season. The recovery plan identifies road kills as a potentially significant mortality factor when roads are in close proximity to populations (USFWS 1999).

To mitigate potential impacts to the giant garter snake and its habitat, the applicant has proposed the following mitigation measures:

- construction affecting potential giant garter snake habitat will be conducted between May 1 and October 1 in order to avoid impacts to snakes in crevices during the winter dormancy period;

- dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling;
- construction personnel will participate in a WEAP - the WEAP will include information regarding the giant garter snake;
- exclusion fencing will be installed to minimize habitat disturbance;
- biologists will inspect work areas prior to commencement of construction activities, and biologists will have the authority to stop work if a giant garter snake is encountered during construction;
- temporarily disturbed areas will be returned to preconstruction conditions;
- speed limits of 20 miles per hour will be imposed for traffic to and from the construction site; and
- habitat will be replaced for permanently impacted giant garter snake habitat.

For permanent impacts to giant garter snake habitat, the applicant has proposed habitat replacement at a 2:1 ratio for each acre of aquatic habitat impacted. In addition, 2 acres of upland habitat would be replaced for each acre of aquatic habitat impacted. Approximately 0.613 acres of giant garter snake aquatic habitat would be permanently disturbed during replacement of the Teresa Creek Bridge and the Glenn-Colusa Canal Bridge and the Dirks Road realignment (E&L 2006a, p. 8.2-77). Therefore, approximately 1.226 acres of aquatic habitat would be replaced as well as approximately 2.452 acres of associated upland habitat if a 2:1 habitat replacement ratio is used.

Staff agrees with the applicant's proposed mitigation measures, with the exception of the habitat replacement ratio proposed by the applicant. USFWS guidelines indicate that the replacement ratio for permanent impacts to giant garter snake habitat should be 3:1 instead of the 2:1 ratio proposed by the applicant. Therefore, staff proposes mitigation of at least 1.839 acres (0.613 acres disturbed x 3) of giant garter snake aquatic habitat and 3.678 acres (1.839 acres x 2) of giant garter snake upland habitat.

Staff's proposed Condition of Certification **BIO-16** requires that the project owner comply with USFWS avoidance and minimization measures for construction impacts to giant garter snake and that the applicant purchase habitat credits at an approved mitigation bank. Conditions of Certification **BIO-11** and **BIO-6** require that the project owner comply with the terms and conditions in the USFWS Biological Opinion. In addition, impacts to giant garter snake would normally require a CDFG incidental take permit or consistency determination. A consistency determination means that CDFG has determined that the conditions specified in the federal Incidental Take Permit are consistent with the California Endangered Species Act (CESA). If CDFG determines that the federal permit is not consistent with CESA, the applicant must apply for a state Incidental Take Permit under section 2081(b) of the Fish and Game Code. Condition of Certification **BIO-8** requires that the project owner comply with the terms and conditions of CDFG's Incidental Take Permit or consistency determination.
In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, and **BIO-5** are necessary to ensure that impacts to special-status reptiles are mitigated to less than significant levels.

Special-Status Birds

Swainson's Hawks

Swainson's hawks require large, open grasslands with abundant prey in association with suitable nest trees. Swainson's hawks were once found throughout lowland California and were absent only from the Sierra Nevada, north Coast Ranges and Klamath Mountains, and portions of the desert regions of the state. The species' population declined as much as 90% between 1900 and 1979 (Bloom 1980). The primary cause of decline has been the statewide degradation of riparian forest and woodlands, and conversion of grassland to incompatible crop types (Estep 1989). Additional threats are habitat loss due to riverbank protection projects, shooting, pesticide poisoning of prey animals and hawks on wintering grounds, competition from other raptors, and human disturbance at nest sites. There are approximately 2,086 breeding pairs in California (Anderson 2007, pers. comm.), and the species range is restricted to portions of the Central Valley and the Great Basin where suitable nesting and foraging habitat is still available. Central Valley populations are centered on Sacramento, San Joaquin, and Yolo Counties (CDFG 1983).

The project site provides Swainson's hawk foraging habitat, and construction of the project will permanently impact approximately 33.4 acres of this habitat; however, the construction of the CGS is not expected to have direct adverse impacts on specific individuals or breeding pairs of Swainson's hawks. No known pairs occur within 1 mile of the site or associated linear facilities. No trees will be removed at the site so there will be no adverse impacts to nesting trees. Condition of Certification **BIO-20** requires that protocol-level surveys for the Swainson's hawk be conducted prior to construction. If surveys identify Swainson's hawks that will be directly impacted by the project, additional mitigation measures will be required, as outlined in staff's proposed Condition of Certification **BIO-20**.

Burrowing Owls

The western burrowing owl, a state species of special concern, inhabits dry, open grasslands and typically nests in small burrows that have been constructed and abandoned by burrowing mammals such as ground squirrels or badgers. Burrowing owls are year-long residents; their breeding season is late February through August with peak breeding occurring between mid April and mid July. Direct mortality of juvenile and adult burrowing owls has been known to result from destruction, plugging, and flooding of occupied burrows, collisions with motor vehicles, aircraft, and wind turbines, predation by native and domestic animals, exposure to certain insecticides and rodenticides, and shooting (Klute et. al. 2003).

Burrowing owls and burrowing owl burrows have been observed in several locations on the CGS site, in the vicinity of the site, and along the roads leading to the site (E&L 2006a, pp 8.2-18,19; J. Mathias, pers. obs., January 5, 2007). The CGS would directly impact burrowing owls inhabiting construction areas at the onset of construction. Destruction of unoccupied burrows would cause impacts to burrowing owls, and noise and visual disturbance from construction may also impact owls in the surrounding area.

The applicant has proposed preconstruction surveys and implementation of measures recommended in the CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995), including passive relocation of birds in occupied burrows and protection of offsite burrowing owl habitat in the event that impacts to occupied burrows cannot be avoided. If occupied burrows are impacted, the applicant has proposed preservation of 6.5 acres of burrowing owl habitat for each impacted burrow. Condition of Certification **BIO-15** requires that the applicant implement the mitigation and avoidance measures outlined in CDFG's burrowing owl mitigation report. Implementation of staff's proposed Condition of Certification **BIO-15** would reduce the impacts to less then significant levels.

In addition, staff's proposed Conditions of Certification **BIO-1, BIO-2, BIO-3**, **BIO-4**, **BIO-5**, and **BIO-6** are necessary to ensure that impacts to special status birds are mitigated to less than significant levels.

Lighting Impacts

Lighting has the potential to impact wildlife in the project area. Some species of birds are believed to be attracted to night lighting. If lighting at the CGS attracts birds, those birds would be more likely to collide with structures associated with the CGS. To minimize the effects of lighting on birds and other wildlife, the applicant has stated that lighting will be shielded to direct light downwards, minimizing impacts to birds (E&L 2006a, p. 8.2-41). Implementation of the applicant's proposed mitigation measures as well as the measures in staff's proposed Condition of Certification **BIO-13** regarding facility lighting will ensure that lighting impacts to wildlife are less than significant.

Electrocution Impacts

Large birds such as raptors and egrets may be impacted due to electrocution from transmission lines and towers. Birds are electrocuted when they simultaneously contact two conductors or a conductor and a ground wire. To mitigate potential electrocution impacts, above-ground transmission lines should be designed in accordance with Avian Power Line Interaction Committee (APLIC) guidelines that are designed to significantly reduce the risk of electrocution (APLIC 2006). The APLIC guidelines outline methods of configuring and designing utility line components and recommend spacing distances between utility line components to reduce the likelihood of avian electrocution. Staff's proposed Condition of Certification **BIO-13** requires that transmission lines under Energy Commission jurisdiction be designed and built in accordance with the Avian Power Line Interaction Committee's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

CUMULATIVE IMPACTS

Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of who is responsible for such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The only other known project currently proposed in Colusa County is an 18-unit subdivision near the City of Maxwell (E&L 2006a, p. 8.2-32). This project may result in additional loss of Swainson's hawk, western burrowing owl, and vernal pool habitat;

however, due to the fact that very little development has been proposed for Colusa County in the foreseeable future, staff does not believe that the CGS will contribute significantly to cumulative impacts to biological resources in the project region.

COMPLIANCE WITH LORS

To be in compliance with applicable laws, ordinances, regulation, and standards, the applicant will need to obtain biological resource-related permits from state and federal agencies. A biological assessment has been submitted to the USACE. The USACE has initiated formal consultation with the USFWS and with the NMFS, and the USFWS and the NMFS will issue separate Biological Opinions for potential impacts to species listed under the federal Endangered Species Act. In addition, a Streambed Alteration Agreement and either an Incidental Take Permit or a consistency determination will be required from CDFG. Condition of Certification **BIO-6** requires that all mitigation measures required by federal, state, and local agencies be incorporated into the BRMIMP and that the project owner implement these mitigation measures.

FACILITY CLOSURE

At some point, the CGS will experience either a planned closure or will be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. To address facility closure, an “onsite contingency plan” will be developed by the project owner, and approved by the Energy Commission compliance project manager (CPM). Facility closure mitigation measures will also be included in the BRMIMP prepared by the applicant.

The restoration of the annual grassland habitat on the proposed project footprint will need to be addressed in any discussion of facility closure. Habitat restoration plans should include such tasks as the removal of all structures and the immediate implementation of habitat restoration measures to establish native plant species and native habitat.

Staff does not have any biological resource facility closure recommendations in the event of an unexpected temporary closure of the CGS. However, in the event that the Energy Commission CPM decides that the facility is permanently closed, the facility closure measures provided in the onsite contingency plan and BRMIMP would need to be implemented.

Condition of Certification **BIO-7** outlines closure plan measures that will ensure that impacts to biological resources are less than significant.

CONCLUSIONS

Biological resources staff is unable to make a final recommendation regarding the CGS. Staff’s proposed conditions of certification are necessary to mitigate impacts to biological resources to less than significant levels; however, additional conditions of certification or modifications to currently proposed conditions of certification may be

necessary based on further consultation with agency personnel and information obtained prior to completion of staff's final staff assessment. For staff to complete the final staff assessment, the following information is needed:

- details on the applicant's proposed locations for purchase of Swainson's hawk habitat, wetland, and giant garter snake habitat mitigation land.

CONDITIONS OF CERTIFICATION

BIO-1 The project owner shall retain a Designated Biologist assigned to the project, and shall submit the resume of the proposed Designated Biologist, with at least 3 references and contact information, to the CPM for approval.

The Designated Biologist must at least meet all of the following minimum qualifications:

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

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

3. 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.

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)

(see **BIO-3** below), but remains the contact for the project owner and CPM. The duties of the Designated Biologist are to:

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 (BRMIMP), to be submitted by the project owner;

3. be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resource compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and 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 noncompliance with any biological resource 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 compliance 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 resource 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.

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, 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.

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

BIO-5 The project owner shall develop and implement a CPM-approved 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 onsite or training center presentation in which supporting written material and electronic media are made available to all participants;

2. discuss the locations and types of sensitive biological resources on the project site and adjacent areas;

3. present the reasons for protecting these resources;

4. present the meaning of various temporary and permanent habitat protection measures;

5. identify whom to contact if there are further comments and questions about the material discussed in the program; and

6. include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two (2) copies of the 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, two copies of the CPM-approved materials shall be submitted.

The signed training acknowledgement forms from construction personnel 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.

BIO-6 The project owner shall prepare a BRMIMP and shall submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and

USFWS (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The 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 resource conditions of certification identified as necessary to avoid or mitigate impacts;

3. all biological resource mitigation, monitoring, and compliance measures required by federal agencies, such as those specified in the USFWS and NMFS Biological Opinions and the USACE 404 water-quality permit;

4. all biological resource mitigation, monitoring, and compliance measures required by the state, such as those specified in the CDFG Incidental Take Permit, Streambed Alteration Agreement, and Regional Water Quality Control Board 401 water-quality certification;

5. all biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;

6. all sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

7. all required mitigation measures for each sensitive biological resource;

8. the required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

9. a detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

10. all locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;

11. aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities – one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;

12. duration for each type of monitoring and a description of monitoring methodologies and frequency;

13. performance standards to be used to help decide if and when proposed mitigation is or is not successful;

14. all performance standards and remedial measures to be implemented if performance standards are not met;

15. a preliminary discussion of biological resource-related facility closure measures;

16. restoration and revegetation plans;

17. a process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and

18. a copy of all biological resource-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 CDFG, the USFWS, and any other appropriate agencies, 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, the CDFG, and USFWS 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 in consultation with CDFG, the USFWS, and appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures shall 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.

BIO-7 The project owner shall incorporate into the permanent or unexpected permanent closure plan and the BRMIMP, measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan shall address the following biological resource-related mitigation measures:

1. removal of transmission conductors when they are no longer used and useful;
2. removal of all power plant site facilities and related facilities;
3. measures to restore wildlife habitat to promote the reestablishment of native plant and wildlife species; and
4. revegetation of the plant site and other disturbed areas utilizing an appropriate seed mixture.

Verification: Draft permanent or unexpected closure measures shall be made part of the BRMIMP. At least 12 months prior to commencement of closure activities, the project owner shall address all biological resource-related issues associated with facility closure and provide final measures in a biological resources element. The biological resources element shall be incorporated into the facility closure plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

BIO-8 The project owner shall acquire an Incidental Take Permit or consistency determination from the California Department of Fish and Game and incorporate its terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Incidental Take Permit or consistency determination.

BIO-9 The project owner shall acquire a Streambed Alteration Agreement from the CDFG (per Section 1600 of the Fish and Game Code), and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Streambed Alteration Agreement.

BIO-10 The project owner shall acquire the Regional Water Quality Control Board section 401 water-quality certification, or a waiver, and incorporate the biological resource-related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall provide the CPM with a copy of the final Regional Water Quality Control Board's 401 certification.

BIO-11 The project owner shall provide a copy of the final Biological Opinion per section 7 of the federal Endangered Species Act obtained from the U.S. Fish and Wildlife Service. The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U.S. Fish and Wildlife Service's Biological Opinion.

BIO-12 The project owner shall provide a copy of the final U.S. Army Corps of Engineers Section 404 permit. The biological resource-related terms and conditions contained in the permit shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U.S. Army Corps of Engineers 404 permit.

BIO-13 The project owner shall implement all feasible measures to avoid or minimize impacts to the local biological resources, including the following:

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

2. screen the water intake pipes that use natural waterways in a manner to avoid entrainment and impingement of fishes;

3. design, install, and maintain transmission lines and electrical components under Energy Commission jurisdiction in accordance with the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006,* to reduce the likelihood of electrocutions of large birds;

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

5. prescribe a road sealant that is nontoxic to wildlife and plants and use only fresh water when adjacent to wetlands, rivers, or drainages canals;

6. design, install, and maintain facility lighting to prevent side casting of light towards wildlife habitat;

7. avoid wetland loss and impacts to wetlands;

8. avoid ground-disturbing activities within 250 feet of vernal pools

9. construction near vernal pools shall occur during the dry season to reduce potential impacts;

10. establish 250-foot buffer zones around vernal pools, to be marked by qualified biologists;

11. use only rubber-tired vehicles within buffer zones;

12. prohibit access of vehicles and personnel within wetland boundaries of vernal pools;

13. use straw wattles or silt fences to prevent sediment from reaching vernal pools;

14. minimize disturbance to alkali grassland habitat;

15. clean construction equipment prior to transportation to the construction site in order to avoid the introduction of invasive weed species; and

16. 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.

BIO-14 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 USFWS and CDFG.

2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week.

3. Prohibit feeding of wildlife by staff and subcontractors.

4. Prohibit nonsecurity-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 sensitive species to the appropriate project representative. Injured animals shall be reported to CDFG and the project owner shall follow instructions that are provided by CDFG.

7. Minimize use of rodenticides and herbicides in the project area (or no use of the ones on the USFWS prohibitive list for areas where amphibians are an issue) and prohibit the use of chemicals and pesticides known to cause harm to amphibians.

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.

BIO-15 The project owner shall implement all mitigation and avoidance measures outlined in CDFG's 1996 *Staff Report on Burrowing Owl Mitigation*. Pre-construction surveys for burrowing owls shall be conducted no more than 14 days prior to site mobilization. If occupied burrows cannot be avoided, the project owner shall protect 6.5 acres of burrowing owl habitat for each occupied burrow impacted. In addition, for each burrow impacted, 2 artificial burrows shall be created or 2 existing burrows shall be enhanced for use by burrowing owls.

Verification: 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. Implementation of burrowing owl mitigation and avoidance measures shall be submitted in the monthly compliance reports.

BIO-16 To mitigate impacts to the giant garter snake and its habitat, the project owner shall implement the USFWS avoidance and minimization measures for construction activities in giant garter snake habitat. For each acre (or portion of an acre) of giant garter snake habitat impacted, the project owner shall purchase three (3) acres of giant garter snake credit at a USFWS-approved conservation bank. The project owner shall purchase credits for at least 1.839 acres of giant garter snake aquatic habitat and 3.678 acres of giant garter snake upland habitat.

Verification: Within 15 days of site or related facilities mobilization the project owner shall provide written evidence of purchase of giant garter snake credits to the CPM.

BIO-17 The project owner shall develop a mitigation plan for impacts due to construction activities at Teresa Creek. The mitigation plan shall include:

1. measures to protect fish species during construction;
2. measures to minimize habitat disturbance during construction;
3. measures to avoid impingement and entrainment of fishes; and
4. measures to maintain water flow at Teresa Creek.

Verification: The mitigation plan shall be included in the project's approved BRMIMP.

BIO-18 The project owner shall submit a revegetation and restoration plan that includes seed mixes and success criteria for restoration of temporarily impacted habitat, and the project owner shall implement the approved plan.

Verification: At least sixty (60) days prior to start of any site or related facility mobilization activities, the project owner shall provide the CPM with two copies of the revegetation and restoration plan for the project, and provide copies to the CDFG and

the USFWS. The CPM, in consultation with the CDFG, the USFWS, and any other appropriate agencies, will determine the revegetation and restoration plan's acceptability within 45 days of receipt.

BIO-19 The project owner shall replace permanently impacted wetlands at a USFWS-approved wetland mitigation bank, as specified in the USACE Individual Permit.

Verification: Within 15 days of site or related facilities mobilization the project owner shall provide a copy of the check or other proof of wetland preservation to the CPM. The project owner shall also provide a letter from the land management organization stating the amount of funds received and the amount of acres purchased for long-term management.

BIO-20 The project owner shall conduct CDFG-recommended protocol-level surveys for Swainson's hawks prior to construction per the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (CDFG 2000). The area to be surveyed shall include a 0.5-mile radius area including and surrounding the project site and a qualified biologist shall conduct the surveys. 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.

To compensate for impacts to Swainson's hawk foraging habitat, the project owner shall provide habitat management lands to CDFG. Habitat management lands shall be protected through fee title acquisition or conservation easement and shall be suitable for Swainson's hawk foraging. A minimum of 25.05 acres of Swainson's hawk foraging habitat in Colusa County shall be protected by the project owner (or 33.4 acres if a Swainson's hawk nest is identified within 1 mile of the project site). The project owner shall provide additional monetary funds for long-term management and monitoring of the protected lands as necessary based on the Center for Natural Lands Management property analysis record, or a similar cost analysis. The project owner shall identify the location of the mitigation area and the entity that shall manage the property in perpetuity for approval by the CPM prior to ground disturbance.

Verification: Preconstruction Swainson's hawk survey results shall be provided to the CPM within 60 days of completion of surveys. At least fifteen (15) days prior to site or related facilities mobilization, the project owner shall provide a copy of the check to the CPM. The project owner shall also provide a letter from the land management organization stating the amount of funds received and the number of acres purchased for perpetual management.

BIO-21 The project owner shall provide final copies of the Biological Opinion per section 7 of the federal endangered species act obtained from the National Marine Fisheries Service (NMFS). The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP and shall be implemented by the project owner.

Verification: At least thirty (30) days prior to the start of any site or related facilities mobilization activities the project owner shall submit to the CPM a copy of the NMFS Biological Opinion.

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CULTURAL RESOURCES

Dorothy Torres

SUMMARY OF CONCLUSIONS

Staff has determined that the Colusa Generating Station project (CGS) would have no impact on known significant archaeological resources, historic standing structures, or ethnographic resources. Adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-7** would mitigate any impacts to newly discovered archaeological sites to below a level of significance. Staff's proposed Conditions of Certification would ensure that the proposed project's incremental effect is not cumulatively considerable.

INTRODUCTION

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

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. They may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. The prehistoric period began over 11,500 years ago and extended through the eighteenth century until 1769, the time when the first Spaniards settled in Alta California which is now called California.

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

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

For the CGS analysis, 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, a consideration of the significance of those cultural resources, and an analysis of the effects of possible project impacts on those cultural resources, using significance criteria from the California Environmental Quality Act (CEQA). Where significant impacts to significant cultural resources, both known and not yet discovered, cannot be avoided, measures to mitigate the adverse effects on or loss of the resources are proposed. The

primary concerns are to ensure that all potential impacts to cultural resources are identified and that conditions are imposed on the project to ensure that any significant impacts are reduced 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, namely CEQA. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

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

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

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

California Code of Regulations, Title 14, section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).
Public Resources Code 5024.1	The California Register of Historic Resources (CRHR) is established and includes properties determined eligible for the National Register of Historic Places (NRHP)(criteria: A. events, B. important persons, C. distinctive construction, and D. data), State Historic Landmark No. 770 and subsequent numbered landmarks, points of historical interest recommended for listing by the State Historic Resources Commission, and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR criteria are 1) events, 2) important persons, 3) distinctive construction, and 4) data.
Public Resources Code 5020.1 (h)	"Historic district" means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
California Health and Safety Code, section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
Colusa County General Plan	The Colusa County General Plan calls for the preservation of cultural and historical resources throughout the county. To promote preservation of these resources, the general plan establishes several objectives, including the preservation of historical buildings, landmarks, and places of historical significance; conservation of historical resources, including archaeological sites; and appreciation of the county's heritage through preservation of locally important historical sites. To meet these objectives, the county has adopted a series of policies related to the management of cultural resources.
Colusa County General Plan Policy CO-22	This policy calls for the preservation and re-use of historical sites and structures.
Colusa County General Plan Policy CO-23	This policy refers to application for landmark status or National Register listing of potentially eligible historical sites

Colusa County General Plan Policy CO-24	This policy requires cooperation with cities, agencies, and landowners in the preservation of cultural resources.
Colusa County General Plan Policy CO-25	This policy requires an archaeological survey prior to approval of any project that would involve ground disturbances where archaeological resources are known to be present.

SETTING

REGIONAL SETTING

The project area is located in the western Sacramento Valley approximately 70 miles north of the City of Sacramento. The Sacramento River is about 12 miles to the east of the project area, and low, north-south trending ridges that comprise foothills of the Coast Range begin about 8 miles to the west.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed power plant, associated fuel, water, and electrical transmission lines, access road, and construction staging areas will be located in the northern part of rural unincorporated Colusa County. The site is approximately 7 miles north of the rural, farm community of Maxwell and 14 miles north of the community of Williams. The proposed site is adjacent to an existing Pacific Gas and Electric Company (PG&E) natural gas compressor station located four miles west of Interstate 5 and one mile west of the junction of Delevan Road and Dirks Road. The area reflects intensive agricultural activity characteristic of the western Sacramento Valley. The site lies between the Glenn-Colusa Canal, located 0.75 mile to the west, and the Tehama-Colusa Canal, located 0.5 mile to the east. Minor natural streams such as Hunters Creek and Funks Creek drain seasonal runoff from the foothills of the Coast Range eastward toward marshy lowlands of the Colusa Basin in the Sacramento Valley. Soils in areas proposed for new construction have been used historically for grazing and are otherwise largely undisturbed.

Refer to the **Project Description** section of this Preliminary Staff Assessment for additional information and maps of the project development region and the project area.

Prehistoric Setting

The project area lies near the prehistoric cultural area designated as the Delta subregion of the Central Valley, which is characterized by marshes and sloughs radiating from the confluence of the Sacramento and San Joaquin Rivers (Moratto 1984). The cultural sequence in this region includes three broad archaeological patterns. The earliest known sites belong to the Windmiller Pattern and date from 5,000 to 2,500 years ago. (Sites from earlier periods are probably buried under alluvial deposition brought on by warmer Holocene conditions and rising sea and stream levels.) Sites from between 2,500 and 1,500 years ago define the transitional Berkeley Pattern. Dating from 1,500 to about 120 years ago, the Augustine Pattern is the central California manifestation of the Late Period and represents the archaeological signature of speakers of the Wintuan language, such as the Patwin of the lower Sacramento Valley where the project area is located. Arrow points, harpoons, shell beads, and

ceramic items mark Augustine sites (Moratto 1984). Habitation sites would most likely be found along rivers and streams, with short-term camps and activity locations possible in any areas not subject to inundation.

Ethnographic Setting

California anthropologist Alfred Kroeber (1925, 1932) prepared the most complete ethnographic analyses of the Patwin, with a shorter synthesis later provided by Patti Johnson (1978). Journalist Stephen Powers recorded early, first-hand observations of the Patwin, referring to them by the group's term *pat-win* for man or person (Powers 1877).

The Patwin were organized into politically independent tribelets, each anchored by a permanent village and a number of smaller camps, most located along perennial streams. The closest known Patwin villages were situated along the banks of the Sacramento River approximately 14 miles east of the project area (Johnson 1978). Villages were located on high ground to avoid seasonal flooding and consisted of dome-shaped, earth-covered structures.

The Patwin were hunter-gatherer-fishers who depended on seasonally available plant foods (chiefly acorns) and a range of terrestrial and riverine animals. Salmon and sturgeon were caught with weirs; smaller fish were netted or speared. Hunters sought deer, elk, antelope, waterfowl, and turtles. Freshwater shellfish were collected along the edges of streams. Patwin material culture featured skillful basketry, tule balsa boats, flaked and ground stone tools, and items fashioned from shell, wood, and bone (Johnson 1978).

Historical Setting

The Spanish began to establish missions in Alta California in 1769, starting with Mission San Diego de Alcalá and ending in 1823 with Mission San Francisco Solano in Sonoma, the mission closest to the project area. After Mexico became independent from Spain in 1821, the missions were secularized (removed from Church control) by the Mexican government during the early 1830s. Former mission lands were granted to soldiers, prominent Mexican citizens, and other individuals for use as cattle ranches. However, neither Spanish nor Mexican control over the region resulted in substantial settlements near the project area. The earliest land grant in the area, known as the Larkin Children's Rancho, was located along the west bank of the Sacramento River and was conferred in 1844.

California became part of the United States in 1848 when the territory was formally ceded by Mexico in the Treaty of Guadalupe Hidalgo. The State of California was admitted to the Union in 1850, and Colusa County and the town of Colusa were founded that year. The town of Colusa (the county seat) was located on the Sacramento River, the principal means of transportation in the region prior to the arrival of the railroad in the 1870s. Barges and steamboats traveled the Sacramento River, bringing goods to rural stores and Gold Rush miners and returning to Sacramento with wheat and other produce (Marschner 2000). The arrival of the Southern Pacific Railroad spurred the founding of towns away from the river, such as Williams (1876) and Maxwell (1878).

Agriculture in the western Sacramento Valley prior to 1900 consisted mostly of wheat farming and was dependent on seasonal rainfall. Attempts at building an irrigation system in Colusa County began in 1887 with the formation of the Central Irrigation District. However, this district and its successors, the Central Canal and Irrigation Company and the Sacramento Valley Westside Canal Company, met with financial difficulties, and only a few miles of canals and other facilities were built. Construction of a major irrigation system was not successful until the early 1920s when the Glenn-Colusa Irrigation District purchased the assets of the Sacramento Valley Westside Canal Company and completed the 65-mile Glenn-Colusa Canal. The availability of abundant water along with relatively impermeable clay subsoil made rice farming practical. Rice is still the principal crop in the area.

The 1920s also saw development of large-scale hydroelectric transmission line systems in northern California, including the 140-mile-long Pacific Gas and Electric (PG&E) Pit-Vaca Dixon line that passes through the project area. This line brought hydroelectric power produced in Shasta County to the San Francisco Bay Area. This system was the first in the country designed to operate at 220-kV, rather than 110-kV.

The northern Colusa County region remains intensively agricultural today. Archaeological sites from the historical period that could be significant would include subsurface physical remains associated with occupation or operation of nineteenth century farms, ranches, and related features. Above-ground historical resources that could be significant include canals, transmission lines, and farm structures.

Resources Inventory

Methods: Literature/Records Search and Native American Contacts

Prior to preparation of the AFC, consultants to the applicant conducted a literature search and reviewed site records and maps at the Northwest Information Center of the California Historical Resources Information System (CHRIS) (Reliant 2001a). The records searches did not identify any previously recorded prehistoric or historic archaeological resources within one mile of the proposed project (the power plant and associated linear routes*)* (Hale 2001). The records search indicated that three previous cultural resources investigations have been conducted in or near the project area.

Consultants to the applicant also carried out research to identify historical resources more than 45 years old in the vicinity of the project**.** The Office of Historic Preservation recommends that 45 years should be used as a time frame for evaluating cultural resources rather than 50 years because some projects take several years to complete after they are permitted (OHP 1995).Their research included consulting local and state-wide record databases and contacting local libraries, historical organizations, and individuals at various Colusa and Glenn County offices, departments, and utility companies (E&L 2006a, p. 8.3-1; Reliant 2001a, p. 8.3-9).

Reliant Energy sent letters to Native Americans listed by the Native American Heritage Commission (NAHC) on February 28, 2001. The NAHC was contacted again on January 19, 2007, to request an updated list of Native Americans who may have heritage concerns in the project area. The NAHC was also asked to search their Sacred Lands File for any sites of cultural significance to the Native American community in the

vicinity of the CGS. A list of nine Native American groups or individuals was provided to the consultants on January 27, 2007, along with a negative search result of its Sacred Lands Files.

On February 7, 2007, an informational letter describing the proposed project was sent to each of the nine Native American groups or individuals listed by the NAHC. To date, one response has been received. Ren Reynolds of the Enterprise Rancheria of the Butte Tribal Council of the Estom Yumeka Maidu Tribe in Oroville, California, identified the project area as a known tribal traveling area and homeland. The Butte Tribal Council offered to provide tribal monitors, if needed, and requested that if any cultural resources are uncovered, all work cease until the find is examined by a professional archaeologist and tribal monitor.

On March 7, 2007, URS archaeologists, consultants to the applicant, made follow-up telephone calls to each of the groups and individuals on the list provided by the NAHC. When the individual was not available, a detailed voicemail was left describing the project and providing the name and contact information of URS archaeologists (URS 2007b, pp. 63-1, 64-1). As additional responses are received from the Native American community, they will be documented and provided to the Energy Commission.

The Energy Commission staff requested a list of Native American tribes and individuals that might have heritage concerns in the project area from the Native American Heritage Commission (NAHC) on December 18, 2006. The NAHC responded on December 21, 2006, with a list of 12 contacts for Colusa County. A sacred lands search of the project area failed to identify Native American cultural resources in the immediate project area. Energy Commission staff sent out letters to all 12 contacts on the NAHC list on December 26, 2006.

Ren Reynolds, EPA Site Monitor for Enterprise Rancheria, sent a letter dated January 22, 2007 responding to staff's letter. Mr. Reynold's letter identified the project site as a known tribal traveling area and homeland and offered tribal monitors to assist the project (Reynolds 2007).

At an Energy Commission Workshop on February 21, 2007, Steve Hackney, Colusa County Department of Planning and Building, indicated that Senate Bill 18 (SB18) should be considered because the project will require a general plan amendment. SB18 contains provisions that codify the participation of California Native American tribes in local land-use planning decisions through public hearings and consultation. Project planners therefore need to be aware of time considerations that may be triggered by SB18 regulations (URS 2007g, p. 28-1). SB 18 provides specific time frames that are necessary for the County to fulfill its obligations under the law. These time frames may slow the AFC process because the approval of the land use entitlements needs to occur before the Energy Commission certifies the project. For a more detailed discussion on the land use entitlements for the project read the **Land Use** section in this Preliminary Staff Assessment.

Methods: Field Surveys

The applicant conducted archaeological field surveys of the areas that could be directly impacted by construction of the CGS project and linear features such as transmission

lines, water supply pipeline, natural gas pipeline, and roadway improvements (E&L 2006a; Reliant 2001a). Staging areas were also surveyed. The surveys were conducted in March 2001 and October 2006. Soils within the area that may be affected or impacted other than those associated with the existing PG&E natural gas compressor station, are largely undisturbed, having been used historically for grazing. Ground visibility was characterized as excellent. No archaeological resources were identified as a result of the surveys (E&L 2006a, p. 3-13; Reliant 2001a, p. 8.3-13).

The applicant also performed an historic architectural resources survey (E&L 2006a, p. 8.3-13). The area that may be affected or impacted and included in the historic architecture survey consisted of all parcels within an approximate one-half-mile radius of the proposed power plant location and was conducted in August 2006 by Toni Webb, JRP Historical Consulting (JRP) Architectural Historian.

As a result of the survey for historic architectural resources and a previous survey in 2001, six resources were identified that appeared to be more than 45 years old (E&L 2006a, p. 8.3-15; E&L 2006a, Appendix J, p. 1 ; Reliant 2001a, p. 8.3-15; and Reliant 2001a, Appendix J). These consist of

- Two 230-kV transmission lines,
- the Glenn-Colusa Canal, part of the Delevan Unit of the Glenn-Colusa Irrigation District,
- ranch buildings in Assessor's Parcel Number (APN) 11-14-4,
- a farmstead in APN 11-22-1,
- the Teresa Creek Bridge, and
- a small animal feeder in APN 11-14-21.

The Tehama-Colusa Canal also runs through the area that may be affected or impacted, but was constructed circa 1965 (E&L 2006a, p. 8.3-9). It is less than 45 years old and is not a historical resource. The Tehama-Colusa Canal is not part of the Glenn-Colusa Irrigation District and is operated by the Tehama-Colusa Canal Authority.

The two 230-kV transmission lines run north to south through the project area and are owned by PG&E. The easternmost of the two lines is known as the Cottonwood-Vaca section of the Pit-Vaca Dixon 220-kV line, completed in 1922. The westernmost of the two lines is known as the Cottonwood-Vaca Dixon 220-kV line, completed in 1945. Both lines transmit electricity from the Pit 1 Powerhouse in Shasta County to the Vaca-Dixon substation located about 70 miles south of the project area. The 1922 transmission line was built by the Mount Shasta Power Company (which became a subsidiary of PG&E) and was designed by engineer Frank Baum. This transmission line was the first in the nation designed to operate at 220 - rather than 110-kV. The lines consist of steel towers, insulators, and conductors (connecting cables). The base of each tower flares outward and is supported by four legs. The upper vertical part of each tower supports three cross-arms with a hanging insulator at each end of each arm. Both lines were originally built as 220 - but JRP reports that the Cottonwood-Vaca line was structurally changed and reconductored in 1956. The Cottonwood-Vaca Dixon line has not been changed (URS 2007b, p. 69-1). Currently both lines appear to be 230-kV lines.

The Glenn-Colusa Canal is the main distribution canal for the Glenn-Colusa Irrigation District that provides water to 175,000 acres of farmland in the two counties. Most of the canal system was completed by the end of 1920. The canal begins near the town of Artois in Glenn County, where water is diverted from the Sacramento River, and runs south for about 65 miles, ending near the town of Williams. A segment comprising somewhat less than two miles of the Glenn-Colusa Canal is within the project area. The canal is unlined, and there is an earthen levee on either side. Unpaved maintenance roads run along the tops of both levees.

The project area is located within the Delevan Unit of the Glenn-Colusa Irrigation District. Infrastructure for the Delevan Unit that is in the project area includes interconnections, ditches, valves, concrete turnouts and gates, and a bridge across the canal at Dirks Road. Except for the Dirks Road bridge (built circa 1960), most of the infrastructure dates to the 1920s when the district was originally formed. It is likely that the Glenn-Colusa Irrigation District and the Glenn-Colusa Canal would be eligible for listing on the California Register based on the development of irrigation districts for the irrigation infrastructure of the Sacramento Valley. It is likely that they would be eligible under criteria 1 and 3, and a period of significance would need to be established (E&L 2006a, Appendix J). The proposed CGS project would replace the existing Teresa Creek Bridge, the Glenn-Colusa Canal Bridge and widen the Delevan/McDermott Intersection (E&L 2006a, pp. 3-20 to 3-21). These minimal changes would not cause a significant impact to the canal.

The ranch buildings on APN 11-14-4 are on a 360-acre parcel in Section 1. Structures and features on the property consist of three buildings, one collapsed building, one manufactured home, one water tank, and one abandoned truck with a mounted water tank. These buildings are not shown on a 1958 USGS quadrangle map, and no buildings are shown on this property on earlier maps, indicating that the structures were built circa 1960 or later. The applicant asserts that there is no evidence that the property would meet criteria for consideration G for resources that are less than 50 years old, but possess exceptional significance. Staff agrees with this assertion.

The farmstead at APN 11-22-1 consists of two houses, a barn, an automobile garage, a farm-vehicles garage, and a bunkhouse. This cluster of structures is located near the center of Section 6 southeast of the project site. Based on stylistic characteristics, all structures except the automobile garage appear to have been built circa 1945. The automobile garage appears to be less than 45 years old. It is likely that the farmstead was established in the 1940s for rice farming, as were many farms in the area. Many similar farms survive today (E&L 2006a, Appendix J). The applicant has recommended that the farmstead does not appear to be eligible for listing on the CRHR. Staff agrees with this recommendation.

The Teresa Creek Bridge is a wood bridge with concrete abutments on McDermott Road southeast of the project area. The wooden planks are paved with asphalt. The bridge was built in 1940 and repaired in 1959. The Teresa Creek Bridge would be demolished as a result of this project and a new bridge would be built in its place. The bridge is indirectly associated with rice farming and does not meet the criteria for category 1. No evidence was found that it would meet criteria for category 2 and it was built using a construction type that is commonplace and does not meet criteria for

category 3. The applicant asserts that there is no evidence to suggest that the bridge would meet eligibility criteria for CRHR listing (E&L 2006a, Appendix J, p. 14). Staff agrees with this recommendation.

The animal feeder is a portable wooden structure built on skids and located in parcel APN 11-14-21 in Section 1. It was likely to have been used to feed small animals because it appears to be the right size for calves or sheep (E&L 2006a, Appendix J). There is no evidence that the animal feeder would be eligible for CRHR listing.

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

There are no recorded or known archaeological sites within the project area. The applicant's attempts to learn of locations of additional archaeological sites or historic structures from the California Historical Resources Information System, Colusa County Historical Society, and the Colusa County Historical Records Commission were negative (URS 2007b, Attachment 68-1).

The applicant's 2001 survey of the proposed CGS project area found no archaeological resources in those locations. Based on the negative results of the field survey for archaeological deposits and of the archaeological literature search, no known significant archaeological resources need to be considered when evaluating the impacts of the construction of the CGS.

Findings: Historic Structures Identified and Evaluated for Historical Significance

The applicant's 2001 and 2006 historical architectural surveys identified and recorded six historic-period architectural resources more than 45 years old in the vicinity of the proposed plant site including the two 230 kV transmission lines, the Glenn-Colusa Canal, a small animal feeder, a ranch building in Section 1, a farm in Section 6, and the Teresa Creek Bridge. With the exception of the transmission line and the canal, JRP has recommended that these resources are not eligible for CRHR listing (E&L 2006a, Appendix J p. i). Staff agrees with this recommendation.

JRP recommended that two resources, the segment of Pacific Gas & Electric Company's 230-kV transmission line and the Glenn-Colusa Canal and Irrigation District (GCID) resources have potential to meet National Register Criterion A and Criterion C. Both the transmission line and GCID features appear to be historical resources for the purposes of CEQA (E&L 2006a, Appendix J2, p. i). Based on JRP's findings, staff concurs that these historical resources would also be eligible for CRHR listing.

Findings: Ethnographic Resources Identified and Evaluated for Historical Significance

The NAHC informed the applicant that no known Native American cultural resources in the project area were found in the NAHC's sacred lands database. On February 7, 2007, the applicant sent letters (with maps of the project) to nine Native Americans the NAHC identified as concerned about development projects in Colusa County. The applicant also stated they would make follow-up telephone calls to the individuals or groups who had not replied.

To date, representatives of one group responded to the applicant's letters and/or telephone calls. The responding Native Americans did not identify any previously unknown ethnographic or archaeological resources in the vicinity of the project. The responses expressed the following (Enterprise Rancheria 2007):

- concern that the project area is a known tribal traveling area and homeland;
- desire to be notified if artifacts are found; and
- advice that, by law, the county coroner must be contacted if human remains are found.

LOCAL GOVERNMENT LAND USE ENTITLEMENT AND NATIVE AMERICAN TRIBE CONSULTATION – Senate Bill 18 (Chapter 905, Statutes of 2004) is an act that amended sections of the Civil and Government Codes.

The proposed project requires the following land use entitlements from the County of Colusa to be consistent with land use laws, ordinances, regulations, and standards:

- approval of a parcel map to create a 100-acre parcel from an existing 456-acre property;
- approval of a General Plan Amendment on the proposed 100-acre parcel to change the existing General Plan land use designation from Agriculture-General (AG) to Industrial (I);
- approval of a change of zone district on the proposed 100-acre parcel from Exclusive Agriculture (EA) to Industrial (M); and
- advise the Energy Commission, regarding the County's position concerning whether the County would approve a use permit to allow the operation of the power plant in the its M-Zone, and a height variance to the M-Zone's 50-foot height limitation to allow for the project's two175-foot tall heat recovery steam generator stacks (C of C 1989).

The Colusa County Planning Commission and Board of Supervisors are the preliminary and final county decision-making bodies on the general plan amendment, the change of zone district, and the parcel map requests, respectively. The approval of the land use entitlements needs to occur before the Energy Commission certifies the project. For a more detailed discussion on the land use entitlements for the project read the **Land Use** section in this Preliminary Staff Assessment.

Colusa County is required by statute to consult with Native American tribes as part of the General Plan Amendment process in accordance with General Plan Guidelines. Senate Bill 18, (Chapter 905, Statutes 2004) effective January 1, 2005, requires local governments to consult with tribes prior to making certain planning decisions, and to provide notice to tribes at certain key points in the planning process. These consultation and notice requirements apply to adoption and amendment of general plans and specific plans. The Governor's Office of Planning and Research has prepared "Tribal Consultation Guidelines," dated November 14, 2005, as a supplement to General Plan Guidelines. The Tribal Consultation Guidelines are available online at [http://www.opr.ca.gov/SB182004.html].

Unless further communication with Native Americans discloses sites of ethnographic concern, at this time no significant ethnographic sites have been identified.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

The CEQA Guidelines provide a definition of a historical resource as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR," or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record." (Cal. Code Regs., tit. 14, § 15064.5 (a)). Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward (Pub. Resources Code, § 5024.1 (d)).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[2] a resource must meet at least one of the following four criteria: is associated with events that have made a significant contribution to the broad patterns of our history (Criterion 1); or, is associated with the lives of persons significant in our past (Criterion 2); or, that embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values (Criterion 3); or, that has yielded, or may be likely to yield, information important to history or prehistory (criterion 4) (Public Resources Code section 5024.1). In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code of Regs., tit. 14, § 4852 (c)).

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

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

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 standing structures 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 that 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 creates improved accessibility, and vandalism and/or greater weather exposure become possible.

Ground disturbance accompanying construction at the proposed plant site and along the proposed linear facilities 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

Direct Impacts on Archaeological Resources and Proposed Mitigation

The applicant's record search revealed that there were no previously recorded properties located within 0.5 mile of the study area, and considered the area to have a low probability for archaeological resources. However, it is not clear whether archaeological resources have not been identified because there have been no surveys or whether there has been little human activity in the project area (E&L 2006a, p. 8.3-9). Native Americans, contacted for information regarding heritage concerns in the vicinity of the project, disclosed no archaeological sites in the project area, and the applicant's field survey of CGS impact areas found no archaeological resources.

Thus, staff agrees with the applicant that no significant known archaeological resources have been identified in any of the areas where the proposed project would be built. Consequently, no project-related construction impacts from the CGS that would materially impair the significance of known archaeological resources have been identified, and no mitigation would be required for impacts to known archaeological resources.

In recognition of the possibility that prehistoric archaeological deposits could be encountered during construction, CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and the project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and possibly mitigating impacts to newly discovered archaeological resources be put into place by means of staff's proposed Conditions of Certification to reduce those impacts to a less than significant level.

Despite the expectation that the project area would be of low sensitivity for archaeological resources (URS 2007b, p. 74-1), the applicant has proposed a number of mitigation measures providing for the treatment of previously unknown archaeological resources discovered during CGS construction (E&L 2006a, pp. 8.3-18 to 8.3-19). These measures would include:

- The project would retain a qualified archaeologist prior to ground disturbance. The archaeologist would be a cultural resources specialist (CRS) responsible for implementation of **CUL-2**, **CUL-3**, and **CUL-4**.
- Prior to ground disturbance, the CRS would prepare a Cultural Resources Monitoring and Mitigation Plan (CRMMP).
- Prior to ground disturbance the CRS would prepare and conduct an employee training program.
- Construction monitoring would occur during ground disturbance as the CRS deems appropriate.

Although staff concurs with many of the applicant's suggested mitigation measures, staff has added additional recommendations or has expanded upon the applicant's recommendations to ensure that any and all impacts to cultural resources are mitigated below a level of significance. The applicant's proposed mitigation measures and staff's additional recommendations are incorporated into proposed Conditions of Certification **CUL-1** through **CUL-7**.

Direct Impacts on Historic Structures and Proposed Mitigation

No significant standing historic structures would be demolished for this project. The only significant historic structure located within the project impact area is the Cottonwood-Vaca Dixon transmission line. Construction of the power plant would affect the transmission line because the proposed project requires the removal of two, and alteration of up to four transmission towers.

The applicant states that the proposed CGS would not significantly affect either the integrity of setting or the integrity of material of the transmission line because the historic setting has already been altered and because the impact on the material condition of the line (replacing or removing at most four towers out of a total of 1,491) towers on the line, would be negligible. Staff agrees with the applicant's assessment, and concurs that the CGS construction and operation would not significantly affect the transmission line.

No project-related construction impacts to standing historic structures that would materially impair their significance have been identified, so no mitigation would be required for this class of cultural resources.

Direct Impacts on Ethnographic Resources and Proposed Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans, were identified in the vicinity of the project. Consequently, no mitigation measures would be required for identified ethnographic resources.

Indirect Impacts

Indirect impacts to archaeological resources are those that may result from increased erosion due to site clearance and preparation, or additional access to an area that leads to vandalism or increased weather exposure. Neither the applicant nor staff identified any indirect impacts to cultural resources in the impact area of the proposed project, and so no mitigation of indirect CGS impacts would be required for any class of cultural resources.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.) The construction of other projects in the same vicinity as the proposed project could affect unknown subsurface archaeological deposits (both prehistoric and historic). According to the Colusa County Planning Department, there are no known projects proposed or under construction within 0.5 mile of the proposed project site (URS 2007b, p. 73-1).Therefore, it does not appear that CGS would contribute to a cumulative impact. Project proponents for future projects in the area can mitigate impacts to as yet undiscovered subsurface archaeological deposits to less than significant by implementing 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 or NRHP).

COMPLIANCE WITH APPLICABLE LORS

Implementation of staff's Conditions of Certification in this document will ensure that this project complies with all applicable state laws with respect to cultural resources. The County of Colusa has specific LORS that relate to cultural resources management, but they are not triggered by the resource findings for this project other than conducting an archaeological survey and compliance with CEQA. SB18 (Chapter 905, Statutes 2004) may trigger certain time considerations in the process of seeking a General Plan Amendment. As a result, the applicant should be aware of potential time constraints as the County complies with SB18.

The federal laws are applicable to permits or other actions that might be required by a federal agency. For example, federal laws would apply to the U.S. Army Corps of

Engineers permit process during replacement of the Teresa Creek Bridge because fill would be placed in potential non-wetland waters of the United States. The Corps of Engineers will ensure the application of federal laws as part of their permit process.

CONCLUSIONS

No archaeological resources were identified in the project area as a result of a records search and field survey. However, there is the potential for encountering as yet unidentified subsurface cultural resources during project construction. One above-ground CRHR-eligible resource, the Cottonwood-Vaca section of the Pit-Vaca Dixon 230-kV transmission line, will be impacted by the project, but the impact of removing two towers and replacing four towers and associated conductors will be less than significant.

Staff recommends that the Energy Commission adopt the following proposed cultural resources Conditions of certification **CUL-1** through **CUL-7**, These conditions are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources assessed as significant. To accomplish this, the conditions provide for:

- The hiring of a Cultural Resources Specialist, Cultural Resources Monitors, and Cultural Resources Technical Specialists;
- Cultural resources awareness training for construction workers;
- The archaeological and Native American (if needed) monitoring of ground-disturbing activities;
- The recovery of significant data from discovered archaeological deposits;
- The writing of a technical archaeological report on monitoring activities and findings; and
- The curation of recovered artifacts and associated notes, records, and reports.

When properly implemented and enforced, these Conditions of Certification will mitigate any impacts to unknown significant archaeological resources newly discovered in the project impact areas to a less than significant level.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternates, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities required in accordance with these conditions of certification (conditions). The CRS may elect to obtain the services of Cultural Resource Monitor(s) (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes

recommendations regarding the eligibility to the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner (Discovery). No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of the CRS, unless specifically approved by the Energy Commission Compliance Project Manager (CPM). Approval of a CRS may be denied or revoked for non-compliance issues.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field; and

2. at least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California

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 resume(s) 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. The resume(s) shall demonstrate to the satisfaction of the CPM that the CRS and alternate CRS have the appropriate education, and experience to accomplish the cultural resources tasks that must be addressed during pre-construction, site mobilization, ground disturbance, grading, construction, and operation.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology, or a related field and one year experience monitoring in California, or

2. an AS or AA degree in anthropology, archaeology, historical archaeology, or a related field, and four years experience monitoring in California, or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology, or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS
The resume(s) of any additional technical specialists, for example, historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the approved new CRS the AFC and all cultural documents, field notes, photographs, and other cultural materials generated by the project.

3. At least 20 days prior to preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications at least five days prior to the CRMs beginning on-site duties.

4. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources Conditions of Certification.

CUL-2 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (for example, 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities.

If construction of the project would proceed in phases, maps and drawings, not previously provided, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week until ground disturbance is completed.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

Verification:

1. At least 40 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall provide the AFC, data responses, and confidential cultural resource documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction for those changes.

3. If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.

4. On a weekly basis during preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, email, or fax.

5. Within five days of identifying changes, the project owner shall provide to the CPM written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching;, and construction, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CPM shall provide the project owner with a model CRMMP to adapt for project use. The CRMMP shall be provided in the Archaeological Resource Management Report (ARMR) format, and, per ARMR guidelines, the author's name shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner.

Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's onsite construction manager. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention or disposal, and curation policies as related to the research questions formulated in the research design. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design will be prepared for any resource where data recovery is required.

2. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.

7. A statement that all cultural resources encountered shall be recorded on a Department of Parks and Recreation (DPR) form 523 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.

8. A statement that the project owner shall pay all curation fees and a copy of an agreement with, or other written commitment from, a curation facility to accept artifacts from this project. Any agreements concerning curation shall be retained and available for audit for the life of the project.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during construction and cannot be treated prescriptively.

10. A description of the contents and format of the Cultural Resource Report (CRR), which shall be prepared according to ARMR Guidelines.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall submit the subject CRMMP to the CPM for review and approval. Preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; or construction may not commence until the CRMMP is approved, unless specifically approved by the CPM.

2. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, DPR 523 forms, and additional research reports not previously submitted to the California Historical Resources Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension or extension request. The draft CRR shall be retained at the project site in a secure facility until construction resumes or the project is withdrawn. If the project is withdrawn,

then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected.

3. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-5 Prior to and for the duration of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training shall include:

1. a discussion of applicable laws and penalties under the law,

2. samples or visuals of artifacts that might be found in the project vicinity,

3. instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a Discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources Discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

5. An informational brochure that identifies reporting procedures in the event of a Discovery;

6. An acknowledgement form signed by each worker indicating that they have received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; or construction, shall occur prior

to implementation of the WEAP program, unless specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of preconstruction site mobilization, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

2. On a monthly basis, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, full time at the project site and linear facilities, and ground disturbance full time at laydown areas or other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner (Discovery).

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all earth-moving activities on the construction site or along the linear facility routes for as long as the activities are ongoing. Full-time archaeological monitoring shall require one monitor per active earth-moving machine working in archaeologically sensitive areas, as determined by the CRS in consultation with the CPM.

In the event that the CRS determines that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided or e-mailed by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resource activities and any instances of noncompliance with the Conditions and/or applicable LORS. Copies of the daily logs shall be provided to the CPM by the CRS if requested by the CPM. The CRS shall use these logs to compile a monthly summary report on the progress or status of cultural resources-related activities. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended. The CRS or alternate CRS shall report daily to the CPM on the status of cultural resources-related activities at the construction site and during ground disturbance for linears and other appurtenant facilities, unless reducing or ending daily reporting is requested by the CRS and approved by

the CPM. The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

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 noncompliance with these Conditions.

Upon becoming aware of the situation, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours of any incidents of noncompliance with the Conditions and/or applicable LORS. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction; the CPM will provide or e-mail to the CRS reproducible copies of forms to be used as daily monitoring logs.

2. Each day that no Discoveries are made, the CRS shall provide a statement that “no cultural resources over 50 years of age were discovered” to the CPM as an email or in some other form acceptable to the CPM, unless the CPM has agreed to suspend reporting.

3. On a monthly basis, while monitoring is ongoing, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS. The summary report shall specify why monitoring has been suspended.

4. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a Discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that cultural resources over 50 years of age or, if younger, considered exceptionally significant are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until the CRS has visited the Discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 a.m. on Friday and 8:00 a.m. on Sunday morning, including a description of the Discovery (or changes in character or attributes), the action taken (that is, work stoppage or redirection), a recommendation of eligibility, and recommendations for mitigation of any cultural resources Discoveries, whether or not a determination of significance has been made.

2. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The "Description" entry of the DPR 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.

3. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the Discovery and has approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt construction activities in the vicinity of a cultural resources Discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 a.m. on Friday and 8:00 a.m. on Sunday morning.

2. Completed DPR form 523s shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever is more appropriate for the subject cultural material.

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HAZARDOUS MATERIALS MANAGEMENT

Rick Tyler and Alvin Greenberg PhD

SUMMARY OF CONCLUSIONS

Staff has concluded that, with the exception of project impacts on local fire protection services, the use of hazardous materials at the proposed Colusa Generating Station facility, with staff's proposed mitigation measures, would not pose a significant risk to the public. The analysis of hazardous materials management does not address potential impacts on the environment other than on the public. If there is a potential for hazardous materials impacts on the environment, such impacts are addressed in the appropriate sections of staff's analysis. For example potential impacts on ground or surface water would be addressed in **Soil and Water Resources**.

With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards with the exception of NFPA Section 1720 regarding the adequacy of local fire protection services. In response to California Health and Safety Code, section 25531 and the following, the applicant would be required to develop a risk management plan. To ensure adequacy of the risk management plan, staff's proposed conditions of certification would require that the plan be submitted for concurrent review by U.S. Environmental Protection Agency, Colusa County Department of Environmental Health, and California Energy Commission staff. In addition, staff's proposed conditions of certification require the Colusa County Department of Environmental Health's review and staff's review and approval of the plan prior to delivery of any reportable hazardous materials identified by California Health and Safety Code, section 25532 (j). Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed Colusa Generating Station (CGS) 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 facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide employees with 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 the requirements applicable to the protection of workers from such risks.

Aqueous ammonia (19 percent ammonia in aqueous solution) is the only hazardous material proposed to be used or stored at the CGS in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (CGS 2006a, Table 8.12-1). Aqueous ammonia will be used for controlling emissions of oxides of nitrogen (NO_X) through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more hazardous anhydrous form of ammonia. The high internal energy associated with the high pressure storage of the anhydrous form of ammonia can act as a driving force in an accidental release. Such a release can rapidly introduce large quantities of the material into the ambient air and result in high downwind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, corrosion inhibitors, and water conditioners, will be present at the proposed facility. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used on site during construction. None of these materials poses significant potential for offsite impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. Natural gas will be delivered to the facility through approximately 1500 feet of 8-inch pipeline that will connect to PG&E's gas trunk line located at the north end of PG&E’s compressor station (see Figure 3.3-1) (CGS 2006a, section 3.4.6). The CGS project will also require the transportation of aqueous ammonia to the facility.

This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws, ordinances, regulations, and standards (LORS) 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 (LORS)

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 Ill)
Clean Air Act of 1990 (42 USC, § 7401 et seq. as amended)	Establishes a nationwide emergency planning and response program and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
Clean Air Act section on risk management plans (42 USC, §112(r))	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the Clean Air Act are reflected in the California Health and Safety Code, section 25531 et seq.
49 Code of Federal Regulations parts 172-800 (49 CFR 172-800)	Requires suppliers of hazardous materials to 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.
Clean Water Act (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 plan to be prepared for facilities that store oil that my leak into navigable waters.
49 CFR, part 190	Outlines gas pipeline safety program procedures.
49 CFR Part 191	Addresses transportation of natural and other gas by pipeline and requires annual reports, incident reports, and safety-related condition reports; also requires operators of pipeline systems to notify the U.S. DT of any reportable incident by telephone and then submit a written report within 30 days.
49 CFR, part 192	Addresses transportation of natural and other gas by pipeline minimum federal safety standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land uses that characterize the surrounding land. This part also contains regulations governing pipeline construction that must be followed for class 2 and class 3 pipelines, and requirements for preparing a pipeline integrity management program.

State	
California Health and Safety Code, section 25534, and Title 19, California Code of Regulations (Cal Code Regs), section 2770.5	Directs facility owners storing or handling regulated substances (formerly called "acutely hazardous materials") in reportable quantities to develop a risk management plan (RMP) and submit it to appropriate local authorities, the U.S. Environmental Protection Agency (EPA), and the designated local administering agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program, the California Accidental Release Prevention Program, supersedes the California Risk Management and Prevention Plan.
Title 8, Cal. Code Regs., Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.
Title 8, Cal. Code Regs., Section 458 and Sections 500 to 515	Sets forth requirements for design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society for Material Engineering Pressure Vessel Code, the American National Standards Institute K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, section 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."
California Safe Drinking Water and Toxic Enforcement (Proposition 65) Act	Prevents certain chemicals that cause cancer and reproductive toxicity to be discharged into sources of drinking water.
Local	
Colusa County Department of Environmental Health	Requires new/modified businesses to complete a hazardous materials business plan and RMP prior to final plan/permit approval.

The Certified Unified Program Authority (CUPA), which has responsibility to review Risk Management Programs (RMPs) and Hazardous Materials Business Plans, is the Colusa County Department of Environmental Health. Relative to seismic safety issues, the site is located in Seismic Zone 3. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of California Code of Regulations, Title 24, and the 2003 California Building Code.

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 to cause public health impacts. These include:

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

These are addressed below.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as the associated health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced, which can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in section 8.12.2.2.2.1 of the AFC (CGS 2006a). Staff agrees with the applicant that use of F stability (stagnant air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 111°F are appropriate for conducting the Offsite Consequence Analysis (CGS 2006a, section 8.12.2.2.2.1). Staff believes that these represent a reasonably conservative scenario to reflect worst-case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The site's topography is rolling hills ranging in height form 170 to 190 feet above sea level (CGS 2006a, section 8.1.1).

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 large bearing on health risk. Section 8.12.1 of the AFC states there are no locations, such as hospitals, schools or day care centers, where a significant number of sensitive individuals is typically present within 3 miles of the site. The nearest residence is 1.7 miles from the power plant site, which is well beyond the toxic endpoint zone.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD 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 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. To accomplish this goal, staff utilized the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of an accidental chemical release.

To assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed 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 in 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 controls and administrative controls concerning hazardous materials use. Engineering controls are those physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent a spill of hazardous material from occurring or that can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described in the AFC (CGS 2006a, section 8.12). Staff's assessment followed the five steps listed below.

Step 1: Staff reviewed the chemicals and the amounts proposed for onsite use as listed in Table 8.12-1 of the AFC and determined the need and appropriateness of their use.

Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public were removed from further assessment.

Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different 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 even with the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant were sufficient, no further mitigation was recommended. If the proposed mitigation was not sufficient to reduce the potential for adverse impacts to a level that is less than significant, staff proposed additional prevention and response controls to reduce potential for causing harm to the public to a level that is less than significant. It is only at this point that staff can recommend approval of the facility's use of hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small-Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for offsite impacts as they will be stored in a solid form or in small quantities, have low mobility, or have low levels of toxicity. The hazardous materials that were eliminated from further consideration are discussed briefly below.

During the construction phase of the project, the only hazardous materials proposed for use include paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, and welding flux. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, the infrequency their use and therefore reduced chance of release, and/or the presence of temporary containment berms typically used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lubricating oil, and diesel fuel all have low volatility and represent limited offsite hazards even in larger quantities.

During operations, hazardous chemicals such as hydraulic and lubricating oils and other chemicals (see Hazardous Materials Appendix C for a list of all chemicals proposed to be used and stored at CGS) would be used and stored in relatively small amounts and represent a limited offsite hazard due to their small quantities, low volatility, and/or low toxicity.

Sodium hypochlorite, sodium hydroxide, and sulfuric acid will be stored on -site but do not pose a risk of offsite impacts because the relatively low vapor pressures and downwind concentrations resulting from such spills would be confined to the site due to the slow evaporation rates of these materials. In 1995, staff conducted a quantitative assessment of the potential for impact associated with sulfuric acid use, storage, and transportation, and concluded that no hazard would be posed to the public because of the extremely low volatility of this aqueous solution. However, to protect against risk of volatilization in a fire, staff proposes Condition of Certification HAZ-5, which requires that no combustible or flammable material be stored within 50 feet of the sulfuric acid tank. Condition of Certification HAZ-3 addresses the need to prevent the accidental mixing of sulfuric acid with aqueous ammonia.

After removing from consideration those chemicals that pose no risk of offsite impact, staff continued with steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and aqueous ammonia.

Large-Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed mostly of methane, but it also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is naturally colorless, odorless, and tasteless, and is lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosion if a release were to occur under certain conditions. Due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases, but it can explode under certain conditions, as happened in Belgium in July 2004.

While natural gas will be used in significant quantities, it will not be stored on site. The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. The National Fire Protection Association (NFPA section 85A) requires 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, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas and would significantly reduce the potential for equipment failure due to improper maintenance or human error.

Aqueous Ammonia

Aqueous ammonia will be used to control NOx emissions from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in significant downwind concentrations of ammonia gas. A single 20,000-gallon-capacity above-ground storage tank will be used to store the 19 percent aqueous ammonia (CGS 2006a, section 8.12).

Based on staff's analysis, aqueous ammonia is the only hazardous material that may pose a risk of offsite impacts. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that will be used and stored on site. However, as with sodium hypochlorite solution, the use of aqueous ammonia poses far less risk than use of the much more hazardous anhydrous ammonia.

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff used the four "bench mark" exposure levels of ammonia gas occurring off site. These include: 1) the lowest concentration posing a risk of lethality of 2,000 parts per million (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 EPA and California; and 4) the level considered by Energy Commission staff to be without serious adverse effects on the public for a one-time exposure, which is 75 ppm averaged over 30 minutes. An accidental release causing exposures above 75 ppm is unlikely and is not expected to occur during the life of the project. Any release that produces exposures below 75 ppm is considered insignificant. If staff's analysis determines that the exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assess the probability of occurrence of the release and/or the nature of the potentially exposed population to determine the likelihood of a significant impact. A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in **Hazardous Materials Appendixes A and B.**

Section 8.12.2.2.1 of the AFC (CGS 2006a) describes the modeling parameters used for the worst-case accidental releases of aqueous ammonia in the applicant's offsite consequence analysis. This modeling used EPA's SCREEN 3 air dispersion model for a worst-case release associated with a failure of the storage tank into the containment area.

Staff has reviewed the applicant's aqueous ammonia modeling calculations and conclusions as well as potential for impacts on minority populations (as identified in **Socioeconomics Figure 1**). Staff believes that due to the engineering controls proposed by the applicant for the storage and transfer of aqueous ammonia, any potential accidental release of aqueous ammonia at the project site will not cause a significant impact and will not represent a significant risk to the public. However, the proposed facility will result in an impact on local fire protection services provided by the Maxwell Fire Protection District. The current level of staffing, training, and equipment available to the fire district is not sufficient to provide effective public protection for the proposed facility and anticipated local growth (L&W 2007d).

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced by implementing a safety management program, which includes the use of both engineering and administrative controls. Elements of facility controls and the safety management program, as required by condition of certification **HAZ-3,** are summarized below.

Engineering Controls

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

- construction of secondary containment areas surrounding each of the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;

- physical separation of stored chemicals in isolated containment areas separated by a noncombustible partition to prevent accidental mixing of incompatible materials, which may result in the evolution and release of toxic gases or fumes;
- installation of automatic sprinkler systems and an exhaust system for indoor hazardous materials storage areas;
- construction of a concrete secondary containment area surrounding the aqueous ammonia storage tank, with a sloped floor that will drain any liquid into a covered sump;
- construction of a bermed containment area surrounding the truck unloading area, with a sloped floor draining into the spill vault under the storage tank; and
- installation of process monitoring systems including continuous tank-level monitors, temperature and pressure monitors, alarms, check valves, and emergency block valves.

Administrative Controls

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

A worker health and safety program will be prepared by the applicant and will include (but is not limited to) the following elements (see the **Worker Safety and Fire Protection** section in this PSA 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 operation and maintenance of systems using hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

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

The applicant will also prepare an RMP for aqueous ammonia, as required by the California Accidental Release Prevention regulations and Condition of Certification **HAZ-2**, that would include a program for prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (CGS 2006a, section 8.12.4).

Onsite Spill Response

To address the issue of spill response, the applicant will prepare and implement an emergency response plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, onsite spill containment, prevention equipment and capabilities, and related topics. Emergency procedures will be established that include evacuation, spill cleanup, hazard prevention, and emergency response.

The Maxwell Fire Protection District is the first responder for hazardous materials incidents. The Maxwell Fire Protection District has expressed serious concern regarding the equipment, training, and staffing of this rural all-volunteer fire department (MFPD 2007a). The fire district's concern is yet to be addressed. The fire district estimates that they suffer a funding shortfall of more than $200,000 for effectively responding to a large facility such as the proposed CGS (MFPD 2007a). The concern expressed by the department is consistent with a recent fire-services impact study (L&W 2007d). Staff concludes that the project poses an unmitigated significant impact on the fire district and cannot recommend approval of the proposed project until the fire district's concerns are addressed.

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, sulfuric acid, and cleaning chemicals, will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the dominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation route for hazardous materials delivery, which goes from Interstate 5 to Delevan Road, then to McDermott Road, then to Dirks Road, and finally to the proposed facility access road. (CGS 2006a, section 8.12.2.2).

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend on the location of the accident and on the rate of dispersion of ammonia vapor from the surface of the ammonia pool. The potential of an accidental release during transport is dependent on three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and
- accident rates along similar roads.

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 Interstate 5. Consistent with CEQA, staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq., the US Department of Transportation Regulations 49 CFR subpart H, §172-700, and California DMV

regulations on hazardous cargo). These regulations also address the issue of driver competence.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in U.S. DOT-certified vehicles with design capacity of 6,500 gallons. These vehicles will be designed to U.S. DOT Code MC-306 or MC-307. These are high-integrity vehicles designed for hauling of caustic materials such as aqueous ammonia.

Staff has, therefore, proposed Condition of Certification HAZ-6 to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker truck) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risks of a hazardous materials transportation accident.

Staff used data from Davies and Lees (1992), which references the 1990 Harwood et al. study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well-designed roads and highways.

The maximum CGS usage of aqueous ammonia each year will require up to 104 annual tanker-truck loads, each delivering about 4000 gallons. Each fully loaded tanker truck bringing would travel approximately 5 miles from Interstate 5 to the facility on local roads. This would result in about 420 miles of tanker-truck travel in the project area per year. Staff believes that the risk over this distance is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000 per mile of roadway traveled.

In addition, staff calculated the risk of an accident associated with aqueous ammonia delivery from the freeway to the facility. Results show the annual risk of a significant spill to be 0.3 in 1,000,000 for one trip and 31 in 1,000,000 for 104 deliveries. This risk was calculated using accident rates on various types of roads (urban, one-lane, and two-lane) with distances traveled on each type of road computed separately. This is an extremely conservative model that does not include the low probability of many other factors such as dispersion of released material that affect the risk of impact. However, even these conservative results show that the risk of transportation impacts is insignificant.

Staff therefore believes that the risk of public exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant for two reasons: 1) because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public, and 2) because of the already diluted concentration of the aqueous ammonia being transported. The transportation of similar volumes of hazardous materials on the nation's highways is not unique or infrequent. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with

data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

Based on the environmental mobility, toxicity, and quantity present at the site, and the frequency of delivery, it is staff's opinion that aqueous ammonia poses the dominant risk associated with hazardous materials transportation and use due to its relative potential for higher exposure compared with other materials present. Because the risk associated with ammonia is insignificant and the risks associated with other materials are even lower, staff concludes that the risk associated with transportation of other hazardous materials is also insignificant.

Seismic Issues

The possibility exists that an earthquake could cause release of hazardous materials from a storage tank. It could also cause the failure of the secondary containment system (berms and dikes) as well as the electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off site and impacting the residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995 heighten the concern regarding earthquake safety.

Information obtained after the Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage, which included 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 that should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. The CGS facility will be designed and constructed to the applicable standards of the 2003 California Building Code. The site is within Seismic Zone 3 (CGS 2006a, section 8.12.1). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks designed to standards similar to those in California, staff determined that tank failures at the project site during seismic events are not probable and do not represent a significant risk to the public.

Site Security

The CGS facility proposes to use hazardous materials that have been identified by the EPA as materials where special site security measures should be developed and implemented to ensure that unauthorized access is prevented. Four federal agencies have published alerts and/or guidelines on this topic: The EPA published a chemical accident prevention alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Council published security guidelines for the electricity sector in 2002 (NERC 2002), and the U.S. Department of Energy published a draft vulnerability assessment methodology for

electric power infrastructure in 2002 (DOE 2002). The energy generation sector is one of the 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security.

To ensure that the CGS facility or a CGS shipment of hazardous material is not the target of unauthorized access, staff's proposed Conditions of Certification HAZ-8 and HAZ-9 address both a construction security plan and an operations security plan. These plans would require the implementation of site security measures consistent with the above-referenced documents and Energy Commission guidelines.

The goal of these conditions of certification is to provide for the minimum level of security for power plants to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant 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 consequences of that event. The results of the offsite consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of consequences of a catastrophic event. To determine the level of security, Energy Commission staff will provide guidance in the form of a vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the NERC 2002 guidelines, and the U.S. Department of Energy VAM-CF model. Basic site security measures shall be required at all locations to protect infrastructure and electrical power generation within the state.

These measures will include perimeter fencing and detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of 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 drivers properly licensed and trained. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials 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 with 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. Department of Energy, or the North American Electric Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the operation of the CGS, combined with existing facilities and foreseeable future projects, to result in cumulative impacts on the population within the area. Staff determined that the chemical with the most potential to cause a cumulative impact is aqueous ammonia. However, it is expected that, with the mitigation measures proposed by applicant and staff's suggested conditions of certification, there will be little possibility for significant offsite airborne ammonia gas and

even less possibility for simultaneous offsite plumes from both the proposed facility and another power plant or other facility handling hazardous materials with similarly low accidental release risks.

The applicant will develop and implement a hazardous materials handling program for the CGS project independent of any other projects considered for cumulative impacts.

Staff's analysis also considered the potential for impacts on minority populations as identified in **Socioeconomics Figure 1**. There is, however, a concern regarding the ability of the Maxwell Fire Protection District to effectively respond to the demand for services created by the proposed facility as well as to the anticipated local growth (L&W 2007d). With the exception of potential impacts on fire protection services, staff concludes that the facility would not contribute to a significant cumulative impact.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the CGS as proposed by the applicant and conditioned by staff, would not comply with all applicable LORS concerning long-term and short-term project impacts in the area of hazardous materials management. The proposed facility would result in violation of NFPA 1720 in that fire protection services provided by the Maxwell Fire Protection District would not be adequate to respond to the special needs associated with hazardous materials used at the facility and the other demands for local service at the same time.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous materials use will pose significant impacts on the public due to impacts on fire protection services. Staff's analysis also shows that there will be significant cumulative impacts for the same reason. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS except NFPA 1720 regarding adequacy of local fire protection services. In response to California Health and Safety Code section 25531 and the following, the applicant will be required to develop an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by EPA and Energy Commission staff. In addition, staff's proposed conditions of certification require review and comment by Colusa County Department of Environmental Health, and staff's review and approval of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

Staff recommends that the Energy Commission not approve the proposed project until the issues regarding local fire protection services are resolved. However, if the project is approved, 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 applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

Staff proposes nine conditions of certification. **HAZ-1** ensures that no hazardous material would be used at the facility except those listed in the AFC, unless there is prior approval by the Colusa County Department of Environmental Health and the Energy Commission CPM. **HAZ-2** requires that an RMP be prepared and submitted prior to the delivery of aqueous ammonia.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario, and therefore proposes Condition **HAZ-3**, requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a safety management plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required RMP. **HAZ-4** requires that the aqueous ammonia storage tank be designed to comply with applicable LORS. **HAZ-5** addresses the storage of sulfuric acid, and the transportation of hazardous materials is addressed in **HAZ-6** and **HAZ-7**. Site security during both the construction and operations phases is addressed in **HAZ-8** and **HAZ-9.**

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in **Appendix C**, below, or in greater quantities than those identified by chemical name in **Appendix C**, below, unless approved in advance by the CPM.

Verification: The project owner shall provide to the CPM, in the annual compliance report, a list of hazardous materials and storage quantities contained at the facility.

HAZ-2 The project owner shall concurrently provide a business plan and a risk management plan (RMP) to the Certified Unified Program Authority (CUPA – Colusa County Department of Environmental Health) and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). After receiving comments from the CUPA, the EPA, and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final business plan and RMP shall then be provided to the CUPA and EPA for information and to the CPM for approval.

Verification: At least sixty (60) days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final business plan to the CPM for approval. At least sixty (60) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

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

Verification: At least sixty (60) days prior to the first delivery of aqueous ammonia to the facility, the project owner shall provide a safety management plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the American Society for Material Engineering Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM for review and approval.

Verification: At least sixty (60) days prior to the first delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall ensure that no flammable material is stored within 50 feet of the sulfuric acid tank.

Verification: At least sixty (60) days prior to the first receipt of sulfuric acid on site, the project owner shall provide to the CPM copies of the facility design drawings showing the location of the sulfuric acid storage tank and the location of any tanks, drums, or piping containing any flammable materials.

HAZ-6 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker-truck transport vehicles that meet or exceed the specifications of U.S. DOT Code MC-307.

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

HAZ-7 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (from Interstate 710, west along Bandini Boulevard, south on Downey Street, west on Fruitland Avenue, and south on Boyle Avenue to the CGS plant site). The project owner shall submit any desired change to the approved delivery route to the CPM for review and approval.

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

HAZ-8 At least 30 days 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-9 To determine the level of security appropriate for this power plant, the project owner shall prepare and submit a vulnerability assessment as part of the operations security plan to the CPM for review and approval. The vulnerability assessment shall be prepared according to guidelines issued by the North American Electrical Reliability Council (NERC 2002), the U.S. Department of Energy (DOE 2002), and the U.S. Department of Justice Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002). Physical site security shall be consistent with the guidelines issued by the NERC (Version 1.0, June 14, 2002) and the U.S. DOE (2002) and will also be based, in part, on the use, storage, and quantity of hazardous materials present at the facility.

The project owner shall also prepare a site-specific security plan for the operational phase, which shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented will be determined by the results of the vulnerability assessment but in no case shall the level of security be less than that described below (NERC 2002).

The operation security plan shall include the following:

1. specifications for a permanent, full perimeter fence or wall, at least 8 feet high;

2. specifications for a 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 or off site;

6. requirements for site personnel background checks, including employee and routine onsite contractors. Site personnel background checks are limited to ascertaining that the employee's claims of identity and employment history are accurate. All site personnel background checks shall be consistent with state and federal law regarding security and privacy;

7. site access controls for employees, contractors, vendors, and visitors;

8. requirements for hazardous materials vendors to prepare and implement security plans as per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks as per 49 CFR Part 1572, subparts A and B;

9. specifications for a closed-circuit TV 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 guards present 24 hours per day, 7 days per week; or

    B. power plant personnel on site 24 hours per day, 7 days per week and, all of the following:

        1) the CCTV monitoring system required in number 9 above shall include cameras that are able to pan, tilt, and zoom, shall have low-light capability, shall be recordable, and shall be able to view 100 percent of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; and

        2) Perimeter breach detectors or onsite motion detectors

        The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power pant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

Verification: At least thirty (30) days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific

vulnerability assessment and operations site security plan are available for review and approval.

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Hazardous Materials
Appendix A
Basis for Staff's Use of 75 PPM Ammonia Exposure Criteria

October 2006

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

Staff uses a health-based airborne concentration of 75 ppm as a threshold for initiating the evaluation of risk of exposure associated with potential accidental releases of ammonia. While this level is not consistent with the 150-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute short-term public emergency limit 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 short-term public emergency limit. **Hazardous Materials Appendix B** provides a summary of adverse effects that might be expected to occur at various airborne concentrations of ammonia.

Hazardous Materials Appendix A Table 1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable[1] Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection	300 ppm	30 min	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury, or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min 4 times	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure
STPEL[1]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min 30 min 10 min	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One–time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr	No toxicity or irritation on continuous exposure for repeated 8-hr shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) – not intended as exposure criteria (see preface attached)	150 ppm	60 min	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general .o.ulationno safetmat[r]on

1) EPA 1987
2) NIOSH 1994
3) NRC 1985
4) NRC 1972
5) AIHA 1989
* 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.

** NRC 1979 describes a study involving young animals that suggests greater sensitivity to acute exposure in young animals. WHO 1986 warns that youth, the elderly, asthmatics, those with bronchitis, and those who 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 FOR HAZARDOUS MATERIALS APPENDIX A TABLE 1

ACGIH: American Conference of Governmental and Industrial Hygienists
AIHA: American Industrial Hygienists Association
EEGL: Emergency exposure guidance level
EPA: US Environmental Protection Agency
ERPG: Emergency Response Planning Guidelines
IDLH: Immediately dangerous to life and health
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
TWA: Time-weighted average
WHO: World Health Organization

HAZARDOUS MATERIALS
APPENDIX B

Summary of Adverse Health Effects of Ammonia

SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA'

638 ppm
WITHIN SECONDS:

- Significant adverse health effects;
- Might interfere with capability to self rescue;
- Reversible effects such as severe eye, nose, and throat irritation.

AFTER 30 MINUTES:

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

266 ppm
WITHIN SECONDS:

- Adverse health effects;
- Very strong odor of ammonia;
- Reversible moderate eye, nose, and throat irritation.

AFTER 30 MINUTES:

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

64 ppm
WITHIN SECONDS:

- Most people would notice a strong odor;

' Source: Alvin Greenberg, Ph.D., QEP

- Tearing of the eyes would occur;
- Odor would be very noticeable and uncomfortable;
- Sensitive people could experience more irritation but would probably still be able to move out of the area;
- Mild eye, nose, or throat irritation;
- Eye, ear, and throat irritation in sensitive people;
- Asthmatics might have breathing difficulties but would could still move out of the area.

22 or 27 ppm

WITHIN SECONDS:

- Most people would notice an odor;
- No tearing of the eyes would occur;
- Odor might be uncomfortable for some;
- Sensitive people may experience some irritation but ability to leave area would not be impaired;
- Slight irritation after 10 minutes in some people.

4.0, 2.2, or 1.6 PPM

- No adverse effects would be expected to occur;
- Doubtful that anyone would notice any ammonia (odor threshold 5 - 20 ppm);
- Some people might experience irritation after one hour.

HAZARDOUS MATERIALS
APPENDIX C

Proposed Onsite Inventory of Hazardous Materials

(Table 8.12-1 from AFC)

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 1 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Hydrogen	A	1333-74-0	Generator Cooling	Acute, fire, pressure, reactive	24,000 scf		-	-	10,000
Sulfuric Acid 29.5 wt%	B	7664-93-9	Station and Gas Turbine Batteries	Acute, chronic, reactive	1,500 US gal		1,000	1,000	-
Carbon Dioxide gas	C	124-38-9	Generator Purging	Acute, chronic, pressure	25,200 scf		-	-	-
Carbon Dioxide liquid	D	124-38-9	Fire Suppression	Acute, chronic, pressure	25,000 lbs		-	-	-
Nitrogen gas	E	7727-37-9	Blanketing	Pressure	200 lbs		-	-	-
Propylene Glycol (Antifreeze)	F	57-55-6	Closed Cooling Water System	Acute, chronic, fire	25 US gal		-	-	-
Alkaline Phosphate Solution (Scale Inhibitor) e.g., Trisodium Phosphate[f]	G	7601-54-9	Boiler Feedwater Scale Control	Acute, chronic	5 × 55 US gal Containers 30 days storage[b]		[5,000]	-	-
Aqueous Ammonia 19.0 wt%	H	7664-41-7	NO_X Emissions Control	Acute, chronic, fire, pressure	20,000 US gal		100	500	20,000
Mineral Insulating Oil	I	None	Electrical Transformers	Acute, chronic, fire	55,000 US gal[c]		-	-	-
Lubricating Oil	J	None	Mechanical Equipment	Acute, chronic, fire	12,400 US gal[c]		-	-	-
Hydrochloric Acid[d]	Stored offsite	7647-01-0	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		5,000	-	15,000

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 2 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Ammonium Bifluoride	Stored offsite	1341-49-7	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		100	-	-
Citric Acid	Stored offsite	77-92-9	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		-	-	-
EDTA Chelant	Stored offsite	62-33-99	HRSG Chemical Cleaning	Acute	Temporary Only[e]		100	-	-
Sodium Nitrate	Stored offsite	7632-00-0	HRSG Chemical Cleaning	Acute	Temporary Only[e]		-	-	-
Diesel Fuel Oil	K	68476-34-6	Diesel Firewater Pump and Diesel Generator	Acute, chronic, fire	880 US gal		-	-	-
Natural Gas	L	None	Gas Turbine Generator and Duct Burner Fuel	Acute, fire, pressure	1,300 lbs Temporary		-	-	-
Sulfuric Acid 93 wt%	M	7664-93-9	Water and Waste-water Treatment	Acute, chronic, reactive	12,000 US gal		1,000	1,000	
Sodium Hydroxide 50 wt%	N	1310-73-2	Water and Waste-water Treatment	Acute, chronic, reactive	6,000 US gal		1,000	500	
Sodium Hypochlorite 12 wt%	O	7681-52-9	Water and Waste-water Treatment	Acute	12,000 US gal				
Aluminum Sulfate, 50 wt%	P	10043-01-3	Water and Waste-water Treatment	Acute	3,000 US gal		5,000		

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 3 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Hydrazine 35 wt%	Q	302-01-2	Boiler Feedwater Corrosion Control	Acute, chronic	2 × 400 US gal containers		1	1,000	-
Aqueous Ammonia 19.0 wt%	R	7664-41-7	Boiler Feedwater Corrosion Control	Acute, chronic, fire, pressure	2 × 400 US gal containers		100	500	20,000
Hydrated Lime	S	471-34-1	Water and Wastewater Treatment		25 ton silo				
Soda Ash	T	497-19-8	Water and Wastewater Treatment		25 ton silo				
Sodium Bisulfite, 38 wt%	U	7631-90-5	Water and Wastewater Treatment	Acute, reactive	2 × 400 US gal containers				

CAS Number = Chemical Abstract Services
Federal RQ = Reportable Quantity
Federal TPQ = Threshold Planning Quantity
Federal TQ = Threshold Quantity
lbs = pounds
scf = standard cubic feet
US gal = US gallons

Notes:

All quantities are approximate.
Demineralizer regeneration chemicals for makeup water are not included

[a] Health hazards include acute (immediate) and chronic (delayed). Physical categories include fires, sudden release of pressure, and reactive.
[b] Chemicals are pre-mixed in portable containers.
[c] In the equipment and pipelines.
[d] Hydrochloric Acid assumed to be aqueous with a concentration greater than 27%.
[e] Gas turbine water wash cleaning chemicals are not stored on site, cleaning is by a contractor.
[f] Trisodium Phosphate is one possible alkaline phosphate solution that may be used.

LAND USE

Mark R. Hamblin

SUMMARY OF CONCLUSIONS

The proposed Colusa Generating Station (CGS) project site would involve a land use that is not consistent with the current county general plan and zone district designations. The applicant has filed the required land use applications with the county of Colusa. If the county approves these applications, the proposed project would be consistent with the county's land use laws, ordinances, regulations, and standards (LORS), and the identified California Environmental Quality Act (CEQA) impacts would be addressed.

INTRODUCTION

In this section, staff evaluates the proposed project specific to the "Land Use Planning" and "Agriculture Resources" checklist criteria in the CEQA, and to determine if it would comply with applicable state and local LORS pertaining to land use and agriculture resources.

SETTING

The proposed CGS project would be built on the valley floor in northern Colusa County, California in an open expanse of rangeland. To the west is Logan Ridge (800-1,000 elevation). To the east is a mosaic of irrigated farmland and scattered single-family residences. Major concentrations of population are isolated in the region. The unincorporated community of Maxwell is approximately 6 miles south-southeast of the project site. U.S. Interstate 5 (I-5) is the major transportation route in the region (see **LAND USE Figure 1** – Aerial View of Project Site and Vicinity).

PROJECT SITE AND VICINITY

The proposed project would be constructed on an approximate 31-acre (facility site) portion of a 100-acre parcel (property site) of an approximate 4,800 acre ranch (Holthouse Ranch), four miles west of I-5. The majority of the ranch is leased for cattle grazing. Approximately 80 acres at the northern end of the ranch is used to grow rice, and 500 acres at the southern end is used for the dryland farming of row crops. The 100-acre subject property is to be leased by the applicant (see **LAND USE Figure 2** - Project Location Map and **LAND USE Figure 3** – View of Project Site Looking North).

To the east of the subject property is the PG&E Delevan Compressor Station. PG&E's 230 kilovolt (kV) transmission lines traverse the eastern edge of the natural gas compressor station property. The Glenn-Colusa Canal is approximately 3,000 feet to the east. The Tehama-Colusa Canal is approximately 2,700 feet west of the site. The 500 kV California-Oregon Transmission Project transmission lines are one mile to the west (see **LAND USE Figure 4a** – View of the PG&E Delevan Compressor Station East of the Project Site, **LAND USE FIGURE 4b** – View Looking East from Front of Project Site, **LAND USE Figure 5** – View Looking West from Project Site).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LAND USE Table 1 provides a general description of state, and local LORS pertaining to land use planning and agriculture resources relevant to the proposed project site. The project's consistency with these LORS is discussed in **LAND USE Table 2**. The project site does not involve federal managed lands; therefore, there are no identified applicable federal land use related LORS affecting the proposed project.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code Section 66410-66499.58	Provides procedures and requirements regulating land division (subdivisions) and parcel legality. Regulation and control of the design and improvement of subdivisions have been vested in the legislative bodies of local agencies.
Local	
Colusa County General Plan (adopted January 13, 1989)	The project site is currently designated "Agriculture-General" (A-G) as shown on the Colusa County Generalized Land Use Plan. The "Agriculture-General" land use designation is generally applied on lands used for orchard and crop production (see **LAND USE Figure 6**).
Colusa County Code Section 4.02 - Exclusive Agricultural	The proposed project site is currently within an "E-A" (Exclusive-Agriculture) Zone. The EA Zone is applied in areas where there are fertile soils, and areas where agriculture is the natural and desirable primary land use; it is for the protection of agriculture from the encroachment of incompatible uses (see **LAND USE Figure 7**).
Colusa County Code, Article 8. Development Standards	Includes minimum development standards applicable to all buildings and uses in all zoning districts. If the development standard of the specific zone is more restrictive, then the more restrictive standard applies. Includes yard area dimensions, height limitations, landscaping, fencing and other requirements.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant land use impact generated by a proposed project, staff reviewed the project using the 2006 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Land Use and Planning." The checklist questions include the following:

A. Would the project physically divide an established community?

B. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

C. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

To determine whether there is a potentially significant agriculture resources impact generated by a proposed project, staff reviewed the 2006 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Agriculture Resources." In making this determination, staff used the California Agricultural Land Evaluation and Site Assessment Model (LESA) prepared by the California Department of Conservation to help address the following checklist questions:

A. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

B. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

C. Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

A project may also generate a potential significant environmental impact related to land use if it would introduce unmitigated air quality, noise, public health hazard, or water supply impacts on surrounding properties. See the **AIR QUALITY**, **NOISE**, **PUBLIC HEALTH**, and **SOIL AND WATER RESOURCES** sections of this document for a detailed discussion of potential project impacts and mitigation.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following two CEQA headings, Land Use and Planning and Agriculture Resources. The CEQA checklist questions have been presented in bold.

LAND USE PLANNING

A. Would the project physically divide an established community?

The proposed project would not physically divide an established community. The community of Maxwell is the closest established community. It is approximately 6 miles from the site.

B. Would the project conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed project would conflict with the county General Plan. The proposed 100-acre project site is currently designated "Agriculture-General" by the county's General Plan and zoned "Exclusive-Agriculture." The project involves a land use that is not consistent with the existing General Plan designation and not allowed by the current zoning on the property. This conflict with the General Plan and zoning would represent a significant impact under CEQA. The applicant has filed the required land

use entitlement applications with the county of Colusa. If the county approves these actions the proposed project would be consistent with the county land use LORS and the CEQA impact would be addressed.

C. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

The proposed project would not conflict with a habitat conservation plan or natural community conservation plan. No approved habitat conservation plan or natural community conservation plan affects the project site or neighboring properties.

AGRICULTURE RESOURCES

To help determine whether impacts to agriculture resources are significant environmental effects, staff used the LESA. The LESA was developed to provide lead agencies with an optional method to ensure that potentially significant effects of agricultural land conversions are quantitatively and consistently considered in the environmental review process (Public Resources Code, section 21095). The LESA was used to address the CEQA checklist questions bolded below.

The LESA is comprised of two calculations. “Land Evaluation” factors based upon measures of the land capability classification and storie index, and “Site Assessment” factors that provide measures of a given project’s size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. For a given project site, the factors are rated, weighted, and combined, resulting in a single numeric score. The LESA scoring is based on a scale of 100 points, with a given project site being capable of deriving a maximum of 50 points from the Land Evaluation factors and 50 points from the Site Assessment factors. The project site score becomes the basis for making a determination of potential significance.

A. Would the project convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use?

The proposed project site involves 100-acres of land shown on a map prepared by the California Department of Conservation, Farmland Mapping and Monitoring Program as “Farmland of Statewide Importance.”

Staff completed a LESA Model worksheet for the project site (see **APPENDIX LU-1**). The score generated for the project’s conversion of 101.19 acres was 32.65 points. A score of 0 to 39 points is not considered significant as shown on Table 9 California Agricultural LESA Model, Instruction Manual, Section IV Scoring Thresholds – Making Determinations of Significance Under CEQA. The proposed project’s conversion of 100-acres would generate a less than significant impact.

B. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The proposed project would conflict with the existing agricultural zoning on the property. The proposed project site is currently zoned “Exclusive-Agriculture” by the county of Colusa. A power plant is a use that is not permitted within this zone district.

This conflict with the zoning would represent a significant impact under CEQA. The applicant has filed the required land use entitlement applications with the county of Colusa. If the county approves these actions the proposed project would be consistent with the county land use LORS and the CEQA impact would be addressed.

The proposed 100-acre parcel is not affected by an executed Williamson Act contract.

C. Would the project involve other changes in the existing environment which, due to their location or nature could result in conversion of farmland, to non-agricultural use?

The PG&E Delevan compressor station is located along the eastern boundary of the proposed project site. Other existing facilities close to the project site include PG&E's 230-kV transmission lines which traverse the eastern edge of the compressor station property. A PG&E natural gas pipeline parallels the site next to the PG&E transmission lines. The 500-kV California-Oregon Transmission Project transmission lines are located approximately one mile west of the project site.

The proposed project would tie into existing transmission lines, interconnect with the existing natural gas pipeline, obtain water from an existing water canal (Tehama-Colusa Canal), and have vehicular access by use of an existing private road; all within an approximate 2,700-foot radius of the project site largely on land used for cattle grazing.

Vegetation will be removed, primarily grass species, and soil will be manipulated. Revegetation of disturbed areas is to occur (E&L2006a, pg. 8-11-9). The gas and water pipelines to serve the project are to be installed underground allowing future agricultural use above them. The proposed project's off-project site conversion of land would generate a less than significant impact.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code section 21083; Cal. Code Regs., tit.14, sections 15064(h), 15065(c), 15130, and 15355.) According to discussions with the Colusa Department of Planning and Building Administration, there are no projects under construction within the vicinity of the proposed project site.

The proposed project is not expected to make a significant contribution to regional impacts related to new development and growth, such as population immigration, the resultant increased demand for public services, and expansion of public infrastructure.

Staff has reviewed Census 2000 information (maps) that show there is not a minority population or a low-income population of greater than fifty percent within a six mile radius of the proposed project site (see the **SOCIOECONOMICS** section of this PSA and **SOCIOECONOMICS Figure 1**). Staff found no potential significant adverse impacts related to land use planning and agriculture resources. The proposed project does not introduce a significant land use planning or agriculture resources impact related to environmental justice issue(s). See the **SOCIOECONOMICS** section of this document for further discussion.

COMPLIANCE WITH LORS

The applicant has filed several land use applications with the county of Colusa (d.b.a. Colusa County Department of Planning and Building Administration) in order for the proposed project to be consistent with the following LORS:

- approval of a tentative parcel map to create a 100-acre parcel from an existing 456-acre section of a total 4,800-acre property (State Subdivision Map Act);
- approval of a General Plan Amendment on the proposed 100-acre parcel to change the existing General Plan land use designation from Agriculture-General (A-G) to Industrial (I) (Colusa County General Plan); and an
- approval of a zone amendment on the proposed 100-acre parcel changing the zoning from Exclusive-Agriculture (EA) to Industrial (M) (Colusa County Code).

The Colusa County Planning Commission and the Board of Supervisors are the preliminary and final county decision-making bodies on the general plan amendment, zone amendment, and the tentative parcel map requests, respectively.

In addition, the county will advise the Energy Commission if it would approve a use permit, if the county were the permitting agency, to do the following: 1) allow a power plant use (operation) on the 100-acre M-Zone property, and 2) allow 29 project structures to exceed the 100-foot height limit for integral appurtenances necessary for the operation of a permitted use in the M-Zone. The proposed project includes 26 transmission line towers that range between 100-125 feet, two heat recovery steam generator stacks that are 175 feet tall, and an air cooled condenser 144 feet tall.

The county of Colusa may use the Energy Commission's Final Staff Assessment (FSA) as the environmental document for the county's actions on the applicant's requested land use applications. The staff assessment has been determined by the California Energy Commission's Chief Counsel to be a legally sufficient document for a city or county to use in making land-use planning decisions even though the Energy Commission has not yet conducted its final decision action on the proposed energy facility project[1]. **LAND USE Table 2** (below) provides a summary description of the applicable state and local LORS and the proposed project's consistency with these

[1] California Energy Commission 2003. Letter from William M. Chamberlain, Chief Counsel, California Energy Commission to Steven M. Cohn, General Counsel Office, Sacramento Municipal Utility District discussing use of Final Staff Assessment as CEQA Environmental Document. April 21, 2003 (Docket April 21, 2003).

LORS. Conditions of certification are proposed to make a project conform to LORS where appropriate.

LAND USE Table 2
Proposed Project's Consistency with
LORS Applicable to Land Use and Agriculture Resources

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
State			
Public Resources Code Section 66410-66499.58 (State Subdivision Map Act)	Provides procedures and requirements regulating land division and parcel legality. Regulation and control of the design and improvement of subdivisions have been vested in the legislative bodies of local agencies.	UNKNOWN DEFERRED TO COUNTY	The applicant has filed a tentative parcel map application with the county of Colusa to create a 100-acre parcel. The applicant's tentative parcel map request is subject to the approval of the county of Colusa which is the administering agency under the State Subdivision Map Act.
Local			
Colusa County General Plan			
Circulation (CIRC) -39	Any proposed pipeline or transmission line within the county shall be aligned so that interference with agriculture is minimized.	YES	The project would interconnect with PG&E transmission lines approximately 1,800 feet east of the project site. The project's span of transmission line to the interconnection point would traverse above cattle grazing land. The proposed gas and water pipelines to serve the project are to be installed underground allowing future agricultural use above them.
Land Use (LU) -23	Freestanding industries in agricultural areas shall be limited to those necessary to produce, process, and distribute agricultural commodities.	NO	The operation of a power plant is not a use consistent with the county's existing agricultural general plan land use designation and zone district on the subject property. The applicant has filed applications with the county of Colusa (d.b.a. Colusa County Department of Planning and Building Administration) for a General Plan Amendment to change the existing "Agricultural-General" land use designation to "Industrial," and a zone amendment to change the zoning from "Exclusive-Agriculture" to "Industrial." A use permit was also necessary. The county's use permit is subsumed in the Energy Commission's certification because of the Commission's exclusive jurisdiction.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
LU-46	Areas designated "Industrial" should not be developed until the following requirements are met: • The area can be readily hooked up to public sewer and water facilities where these facilities are available, or to private sewer and water facilities where utilities do not yet exist; • If the industry uses community utilities, that community systems can accommodate the added demand; • If the industry is to be served by groundwater wells, that reliable, scientific data be presented that will assure that groundwater will be available under all conditions, including drought; that the wells will not have an appreciable adverse effect on the quality and quantity of existing domestic and agricultural water supplies; and that private sewage disposal systems meet Environmental Health Department standards;	YES	Public water and sewer facilities or a community system do not exist within the vicinity of the project site. Power plant water usage is restricted to water for demineralization for the steam cycle, for combustion turbine inlet air evaporative cooling, fire water, service water, and potable water for eyewash stations, drinking, showers, and sanitation. The project will use approximately 126-acre feet of water per year at operation purveyed by the Glen Colusa Irrigation District (GCID). The project owner has obtained a will-serve letter from the GCID. Bottled water will be provided for drinking purposes. Sanitary wastewater from sinks, toilets, and other sanitary facilities would be discharged to an onsite septic tank disposal system. For a more detailed discussion on the water supply and usage, see the **SOIL AND WATER RESOURCES** section of this Preliminary Staff Assessment (PSA). The project will use an air cooled condenser (no water is being evaporated during the cooling process) and will employ a zero liquid discharge system. Also, the project will use recycled water.
	• The project will not significantly contribute to air, water, and noise pollution;	YES	This policy is not limited to the "land use" technical section of the PSA, but applies to multiple technical sections within the PSA and is better addressed under those specific sections. For a more detailed discussion see the **AIR QUALITY**, **SOIL AND WATER RESOURCES**, and **NOISE AND VIBRATION** sections in this PSA. This being said, land use staff has provided a brief synopsis from the air, water and noise sections of the PSA below. The air quality staff's analysis indicates that the project should comply with all applicable LORS and should not result in significant air quality impacts. The project has secured emission reduction credits in sufficient quantity to meet Colusa County Air Pollution Control District requirements and to fully offset all nonattainment pollutants and their precursors at a minimum ratio of 1:1.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
			The soil and water staff analysis indicates that the project's potential degradation to surface-water or groundwater quality would be mitigated through the development and implementation of an effective zero liquid discharge management plan and compliance with the permitting requirements of Colusa County's sewage disposal ordinance. The plant wastewater system would collect all wastewater generated in the operation of the plant and deliver it to the zero liquid discharge (ZLD) system. Wastewater streams would be cycled through the water purification system and returned to the demineralizer as a make-up supply. Sludge from the demineralizer would be concentrated in a dryer and disposed of as solid waste in an approved landfill. The majority of all wastewater generated at the plant would be treated and reused on site (E&L 2006a, section 8.13.2.1.2). Sanitary waste from sinks, toilets, and other sanitary facilities would be discharged to an onsite septic system. The noise and vibration analysis concludes that the project can be built and operated in compliance with all applicable noise and vibration and would not introduce a significant adverse noise impact at operation to surrounding properties.
	• The area has access to a major transportation route;	YES	U.S. Interstate 5 is approximately four miles east of the project site. Delevan Road provides access onto and off of I-5.
	• The impact of the development on local streets can be mitigated;	YES	The traffic and transportation analysis indicates that the existing Teresa Creek bridge on McDermott Road and the existing vehicle bridge over the Glenn-Colusa Canal will need to be replaced to accommodate the heavy construction truck loads. In addition, the turning radius at the Delevan Road/McDermott Road intersection is not adequate to accommodate heavy construction-related truck traffic. The applicant will provide additional gravel on the northeast and southeast corners of the Delevan Road/ McDermott Road intersection. For a more detailed discussion see the **TRAFFIC AND TRANSPORTATION** section of this PSA.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	• The area is located within 10 minutes of a fire station or can provide its own fire protection independently.	YES	The closest fire station to the project site is in the town of Maxwell, 6 miles away. The Colusa Generating Station Fire Service Impact Study estimates the time for a first responder originating from Maxwell to the project site at 16.8 minutes (L&W2007d). The AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable National Fire Protection Agency (NFPA) standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire-extinguishing systems. Water for fighting fires will be supplied from a dedicated 300,000 gallon fire-water storage tank and delivered to the underground firewater loop with fire hydrants at approximately 300-foot intervals (CGS 2006a). A carbon dioxide protection system will be provided for the combustion turbine generators and accessory equipment. The system will have fire-detection sensors that will trigger alarms, turn off ventilation, close ventilation openings, and automatically release the carbon dioxide (CGS 2006a). In addition to the fixed fire-protection system, smoke detectors, flame detectors, temperature detectors, and appropriate class-of-service portable extinguishers and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirement by the NFPA and the Uniform Fire Code (UFC) and Energy Commission staff has determined that they will ensure adequate fire protection. The applicant is to provide a final fire prevention and protection program to Energy Commission staff and to the Maxwell Fire Protection District prior to construction and operation of the project. For a more detailed discussion on fire safety see the **WORKER SAFETY & FIRE PROTECTION** section of this PSA.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Colusa County Code			
Section 4.02 Exclusive-Agriculture or E-A zone (*existing zone district designation*)	The Exclusive-Agriculture or E-A zone is intended to be applied to areas of fertile soils and areas where agriculture is the natural and desirable primary land use, and in which areas the protection of agriculture from the encroachment of incompatible uses is essential to the general welfare.	NO DEFERRED TO COUNTY	The subject property at present is zoned E-A, which does not allow a power plant. The applicant has filed applications for a General Plan Amendment and zone amendment with the county to make the project consistent with the county's land use LORS.
Section 4.12 Industrial or M-Zone (*proposed zone district designation*)	The industrial or M-Zone is intended to apply to areas devoted to light manufacturing, heavy commercial uses, large administrative facilities and normal operations of industries, subject only to such regulations as are needed to control congestion and protect surrounding areas from significant environmental impacts.		The applicant has filed a General Plan Amendment and zone amendment with the county to make the project consistent with the county's land use LORS.
	(b) <u>Uses permitted with a use permit.</u> (10) energy production plants.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The proposed project involves a use listed in the county zoning code as requiring the approval of a use permit in order to conduct it. The county of Colusa's "findings" for the granting of a use permit are found in section 7.28 of the Colusa County Code. Using the section 7.28 findings, land use staff has prepared findings for the proposed project. The findings are presented at the end of Table 2. The county's use permit is subsumed in the Energy Commission's certification because of the Commission's exclusive jurisdiction. The Commission gives due deference, however, to the county's recommendation or the findings to be made.
	(c) <u>Other regulations.</u> (1) Minimum lot size, width, depth and minimum yards: none (2) Maximum building height: fifty feet (3) Development standards as set forth in Article 8.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The proposed project would meet the minimum lot size and yard area requirements. The tallest building on the project site is the water treatment facility at 33.5 feet. See Article 8 discussion below.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Article 8. Development Standards Section 8.01	The following minimum development standards shall apply to all buildings and uses in all zoning districts unless specific development standards of those zones are more restrictive, then the more restrictive standard shall apply.		
Section 8.02. Industrial	No building or structure shall be erected or maintained for any permitted uses within the buildable area of industrial lots within the M land use zones unless the standards and requirements set forth in this article are complied with and maintained (see below).		
	(a) Yards. No building or structure nor the enlargement of any building or structure shall hereafter be erected or located within the industrial zone, or shall any use be conducted in the industrial zone unless the following yards are provided and maintained: (1) Front and side streets yards. There shall be a front and side street yard of at least twenty-five feet between any structure or use within this zone and the public street right-of-way. Such yard may be reduced to a minimum of twenty feet provided that for each square foot of additional buildable area created by the application of this provision an equivalent area of planter or landscaped area is provided in the corresponding front or side street yard. The remaining portions of either the front or side street yard may be used for off-street parking. (2) Rear yard. A rear yard shall not be required except where the rear of a lot in the industrial zone abuts a lot in any residential zone, office-residential mix zone, or interim estate zone, or a commercial or office zone, in which case there shall be a rear yard of not less than fifteen feet. (3) Side yard. A side yard shall not be required except where the side of a lot in the industrial zone abuts a lot in any residential zone, office-residential mix zone, or interim estate zone or a lot in	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The project's site plan shows it would meet the county's yard area requirements. The project site does not adjoin a public street right-of-way. Access to the site is to be provided by use of a private vehicle access (private road). The project site does not adjoin a residential, interim residential, interim estate, recreation, agricultural residential, interim agricultural zones, office-residential mix, commercial, or office zone, and is not subject to yard requirements.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	the commercial or office zone, in which case there shall be a side yard of not less than ten feet. (b) Development requirements. For any use within the M-Zone, no building or structure may be erected or enlarged unless the following development require-ments are maintained in connection with such buildings or uses. (1) A six-foot-high perimeter fence of solid wood or masonry shall be installed along the interior boundary lines of all adjoining residential, interim residential, interim estate, recreation, agricultural residential or interim agricultural zones. Said perimeter fence shall be reduced in height to four feet wherever it is located within twenty-five feet of a street right-of-way. Landscaping shall consist of trees planted thirty feet on center in individual planters sufficiently large and protected so that a parked vehicle does not overhang or intrude the minimum four-by-four foot tree planting area which shall include ground cover, shrubs or climbing plants. The landscaping and fence shall be designed so as to form a visual screen between this zone and the adjoining residential, interim residential, interim estate, recreation, agricultural, agricultural-residential, or interim agricultural zone. The height of such fence, and the screening requirements may be modified by a condition of approval of a use permit or development plan where the appropriate authority finds that due to a significant difference in elevation between parcels different screening requirements are necessary. (2) A planter or landscaped area at least five feet wide, measured on a horizontal plane and excluding curbing, shall be provided adjacent to all street rights-of-way, excluding approved driveway entrances. In addition, any area within the street right-of-way between the edge of the sidewalk and outer edge of the right-of-way shall be	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The project site does not adjoin a residential, interim residential, interim estate, recreation, agricultural residential, interim agricultural zones, office-residential mix, commercial, or office zone. The project site does not adjoin a public street right-of-way. Therefore the project site is not subject to the development requirements in the M-Zone.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	developed as a planter or landscaped area in conjunction with the required five-foot area above, unless this requirement is waived by the director of the department of public works or his designee. The planter width shall be increased to at least eight feet measured on a horizontal plane, and excluding curbing, for at least seven feet of every fifty feet of frontage along street rights-of-way. Within this planter, trees from an approved list shall be planted no further apart than fifty feet on center, at least five feet but no further than ten feet from the back of the sidewalk. The planter shall be bounded by a curb at least six inches high, and shall include shrubs, hedges, and other natural growth, or other features such as berms designed to form a partial visual screen at least three feet in height. Nothing in this section shall preclude the installation of additional landscaping and the planting of additional trees, except near street and driveway intersections where landscaping shall not exceed four feet in height. (3) Additional planters or landscaped areas shall be provided in public parking areas as specified in parking lot standards of this code. (4) Within each planter or landscaped area, an irrigation system and live landscaping shall be provided and maintained. (5) Required planter and landscaped areas shall be protected from vehicle encroachment. (6) Required planter or landscaped areas may be combined with appropriate pedestrian walks and similar hard surface areas provided that such hard surface does not cover more than twenty-five percent of any required planter or landscaped area. Ornamental or landscaping rick and gravel areas, artificial turf, or areas		.

LORS		Consistency Determination	Basis for Consistency
Source	Policy and Strategy Descriptions		
	covered with other artificial materials shall be considered hard surface areas for the purposes of this provision. (c) Height requirements. No building or structure erected on property in the industrial zone shall have a height greater than one hundred feet. Such height limitation may be exceeded by appurtenances necessary to the operation of any permitted use if approved by the appropriate authority; provided, however, that, where a parcel is contiguous to a parcel zoned, at the time of the issuance of the building permit for said building or structures, residential or residential mix zone, said structure or building may not exceed twenty-four feet in height or one story. The board may, however, after a recommendation from the planning commission, grant a conditional use permit to allow a structure or building to be erected to a height not to exceed one hundred feet. The board may consider the following factors before granting such a use permit: (1) The uses of all contiguous parcels. (2) The elevations of the respective parcels. (3) The height and number of stories of any structures or buildings on contiguous parcels. (4) The distance of the proposed building from buildings on contiguous parcels. (5) The beneficial or harmful effect of the height of the building on existing terrain and vegetation. (6) The opportunity for a higher structure to overlook yard areas of contiguous parcels and invade the privacy of such yard areas. (7) The impact of the proposed structure on traffic circulation.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The project proposes a total of 29 structures that would exceed 100 feet in height. The tallest project structures are the two HRSG exhausts stacks which are each 175 feet tall and the air cool condenser at 144 feet. Twenty-six structures range between 100-125 feet in height and consist of transmission line monopoles, take-off towers and lattice towers. These structures are integral appurtenances necessary to the commercial operation of the power plant. The tallest building on the project site is the water treatment facility at 33.5 feet. The project site does not adjoin a residential, interim residential, interim estate, recreation, agricultural residential, interim agricultural zones, office-residential mix, commercial, or office zone. The county code indicates that the appropriate approving authority may grant relief from the strict application of the height requirement for appurtenances necessary to the permitted use. Staff understands the Energy Commission has exclusive permitting authority over the project and is, thus, the “appropriate approving authority” to allow exceedance of the height limitation for necessary appurtenances. The tallest structures are all necessary to the commercial operation of the power plant and should be excused from the height limitation if the project is approved.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Section 7.28 Findings for granting of a use permit.	(a) That the planning commission has the power to issue a use permit under the zoning regulations in effect as applied to the property and proposed uses.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The proposed project requires a General Plan Amendment and zone amendment to be approved by the Colusa County Board of Supervisors thereby allowing the consideration of the use permit by the board of supervisors or planning commission. The planning commission could make a recommendation on these land use applications to the board of supervisors.
	(b) That the procedural requirements set forth in this section have been met.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The California Energy Commission's Rules of Practice and Procedure & Power Plant Site Certification Regulations present the procedural requirements for the processing of a power plant application (AFC). The requirements include public notification and outreach for the staff assessments, public workshops, and evidentiary hearings. The county of Colusa may convene its own public meeting(s) on the power plant application during the Energy Commission's processing of the AFC. Public notification and the public hearing(s) would be handled by the county in accordance with its procedures.
	(c) The granting of the use permit, as conditioned, will not adversely affect the public health, safety or welfare of the county of Colusa.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The public health analysis indicates that the construction and operation of the project is not expected to generate a significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed project uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. For a more detailed discussion see the **PUBLIC HEALTH** section of this PSA. The purpose of the Energy Commission's conditions of certification is to prevent adverse affects that a project may generate to the public health, safety and welfare.

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
	(d) That the proposed use complies with applicable provisions of this code and is consistent with the policies and objectives of the adopted Colusa County General Plan.	YES, IF ZONE AMENDMENT IS ADOPTED BY COUNTY	The proposed project has conditions of certification from twenty technical areas (approx.). In addition to the **PUBLIC HEALTH** section, also see the **AIR QUALITY, SOIL AND WATER RESOURCES**, and **NOISE AND VIBRATION** sections of the PSA. The making of this finding is not limited to the "land use" technical section of the PSA, but applies to multiple technical sections within the PSA and is better addressed under those specific sections. In general, the purpose of the Energy Commission's conditions of certification on a project is to prevent adverse affects that a project may generate to the public health, safety and welfare. Conditions of certification are basically comprised of two components; mitigation measures required by CEQA and state or local LORS. For this project, Energy Commission staff reviewed county LORS for applicability to the project and proposed conditions of certification on the project to make the project comply or conform accordingly to the identified county LORS.

NOTEWORTHY PUBLIC BENEFITS

Noteworthy land use benefits have not been identified.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments have been received on this section.

CONCLUSIONS AND RECOMMENDATIONS

The land use analysis for the project focused on two main issues; (1) would the proposed project conflict with land use planning and agriculture resources impact(s) according to the CEQA, and (2) would the project comply with applicable county LORS pertaining to land use and agriculture resources.

- The proposed project site is in an area currently designated "Agriculture-General" by the Colusa County General Plan and is zoned "Exclusive-Agriculture". Land uses surrounding the project site are designated for agricultural operations.

- The proposed project site would not physically divide an established community. The nearest established community to the project site is Maxwell which is approximately 6 miles from the site.
- The proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan.
- The applicant has filed land use applications with the county of Colusa in order for the proposed project to be consistent with the following LORS:
    - o approval of a tentative parcel map to create a 100-acre parcel (State Subdivision Map Act);
    - o approval of a General Plan Amendment on the proposed 100-acre parcel to change the existing General Plan land use designation from Agriculture-General (A-G) to Industrial (I) (Colusa County General Plan); and an
    - o approval of a zone amendment on the proposed 100-acre parcel changing the zoning from Exclusive-Agriculture (EA) to Industrial (M) (Colusa County Code).

  At the present time, final decisions by the county and the recording of appropriate documents involving the noted items have not occurred. Staff cannot conclude that the project is consistent with county land use LORS.
- If the county approves the applicant's requested General Plan land use and zone amendments, the construction and operation of the project with the effective implementation of the mitigation measures identified by the project owner and staff's recommended condition of certification (below), would not cause any direct, indirect or cumulative adverse land use planning and agriculture resources impacts. Staff's recommended condition of certification would ensure conformance with the applicable Colusa County Code requirements pertaining to the M-Zone district.
- The project site does not involve land that has an executed Williamson Act contract.
- The proposed project involves the conversion of land shown as "Farmland of Statewide Importance" on a map prepared by the California Department of Conservation, Farmland Mapping and Monitoring Program. Staff completed a California Agricultural LESA Model worksheet for the proposed project site. The LESA score for the project site was 32.65 points which is not considered significant by the model's scoring threshold. The project would not cause any direct, indirect, cumulative agriculture resources impact.
- Within a six mile radius of the project site there is not an identified minority population or low-income population of greater than fifty percent. The proposed project does not introduce a significant land use planning or agriculture resources impact related to an environmental justice issue(s).

PROPOSED CONDITION OF CERTIFICATION

LAND-1 The project owner shall design and construct the project to the following design standards found in the M-Zone (Industrial) of the Colusa County Code (Colusa County Code, section 4.12):

1. Minimum lot size, wide, depth and minimum yards: none;

2. The maximum height of any building permitted shall not exceed 50 feet;

3. The maximum height of any structure permitted that is an integral appurtenance necessary to the commercial operation of the power plant shall not exceed 175 feet;

4. Visible storage of materials, parts or equipment, other than company vehicles, is not permitted; and

5. Off-street parking and loading spaces shall be provided. Each parking space shall be not less than eight feet wide, eighteen feet long and seven feet high, and each loading space shall be not less than ten feet wide, twenty-five feet long and fourteen feet high. The number of parking spaces for industrial and public utility buildings: one for each three employees, taking the largest number of employees on duty at any one time.

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 County of Colusa (d.b.a. Colusa County Department of Planning and Building Administration) that the project conforms with the M-Zone of the Colusa County Code (Colusa County Code, section 4.12).

REFERENCES

CEC2003 - California Energy Commission/William M. Chamberlain. Letter to Steven M. Cohn discussing use of Energy Commission Final Staff Assessment as CEQA Environmental Document. Docketed 4/21/03.

COC1989 - County of Colusa. General Plan. Colusa County Department of Planning and Building Administration. January 13, 1989.

COC1991 - County of Colusa. Zoning Ordinance. Colusa County Department of Planning and Building Administration. June 11, 1991.

COC2007c - County of Colusa/S. Hackney (tn: 39865). County of Colusa Request for CEQA Processing Requirements, Responsibility, Authority for the Proposed Colusa Generating Station. Submitted to CEC/ Docket Unit on 4/3/2007.

COC2007i - County of Colusa/S. Hackney (tn: 41044). Letter of Completeness for General Plan Amendment & Zoning Amendment, Tentative Parcel Map, and Use Permit applications. Submitted to CEC/ Docket Unit on 6/19/2007.

E&L2006a - E&L, LLC/A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

L&W2007d - L&W/ M. Carroll (tn: 40671). Colusa Generating Station Fire Service Impact Study. Submitted to CEC/ Docket Unit on 5/30/2007.

URS2007d - URS/ D. Shileikis (tn: 39434). General Plan Amendment and Zoning Amendment Application Packet. Submitted to CEC/ Docket Unit on 3/1/2007.

URS2007e - URS/D. Shileikis (tn: 39435). Major Use Permit Application Packet. Submitted to CEC/ Docket Unit on 3/1/2007.

URS2007f - URS/D. Shileikis (tn: 39436). Tentative Parcel Map Application Packet. Submitted to CEC/ Docket Unit on 3/1/2007.

APPENDIX LU-1

COLUSA GENERATING STATION SITE LESA WORKSHEET

ATTACHED

CALIFORNIA AGRICULTURE LESA WORKSHEET

COMPLETED FOR

COLUSA GENERATION STATION SITE

COLUSA PROJECT SITE SOIL TYPES AND ACREAGE

1. Acreage for CaD (Capay clay 5 to 9 percent slopes) soil type identified as USDA NRCS Soil Symbol - **206**

Total Acres: 5.691

2. Acreage for Cc (Clear lake clay, 0 to 2 percent slopes, occasionally flooded) soil type identified as USDA NRCS Soil Symbol - **200**

Total Acres: 1.439

3. Acreage for CaB (Capay clay, 0 to 3 percent slopes) soil type identified USDA NRCS Soil Symbol - **205**

Total Acres: 12.781

4. Acreage for CaB (Capay clay, 0 to 3 percent slopes) soil type identified as USDA NRCS Soil Symbol – **205**

Total Acres: 0.065

5. Acreage for AaA (Altamont silty clay, 5 to 9 percent slopes) soil type identified as USDA NRCS Soil Symbol - **220**

Total Acres: 81.220

Total acreage of project site based on soil types is 101.19 acres.

Index Map

Appendix A. California Agricultural LESA Worksheets

NOTES

Calculation of the Land Evaluation (LE) Score

Part 1. Land Capability Classification (LCC) Score:

(1) Determine the total acreage of the project.
(2) Determine the soil types within the project area and enter them in **Column A** of the **Land Evaluation Worksheet** provided on page 2-A.
(3) Calculate the total acres of each soil type and enter the amounts in **Column B**.
(4) Divide the acres of each soil type (**Column B**) by the total acreage to determine the proportion of each soil type present. Enter the proportion of each soil type in **Column C**.
(5) Determine the LCC for each soil type from the applicable Soil Survey and enter it in **Column D**.
(6) From the LCC Scoring Table below, determine the point rating corresponding to the LCC for each soil type and enter it in **Column E**.

LCC Scoring Table

LCC Class	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VIe,s,w	VIIe,s,w	VIII
Points	100	90	80	70	60	50	40	30	20	10	0

(7) Multiply the proportion of each soil type (**Column C**) by the point score (**Column E**) and enter the resulting scores in **Column F**.
(8) Sum the LCC scores in **Column F**.
(9) Enter the LCC score in box <1> of the **Final LESA Score Sheet** on page 10-A.

Part 2. Storie Index Score:

(1) Determine the Storie Index rating for each soil type and enter it in **Column G**.
(2) Multiply the proportion of each soil type (**Column C**) by the Storie Index rating (**Column G**) and enter the scores in **Column H**.
(3) Sum the Storie Index scores in **Column H** to gain the Storie Index Score.
(4) Enter the Storie Index Score in box <2> of the **Final LESA Score Sheet** on page 10-A.

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

	A	B	C	D	E	F	G	H
Soil Symbol	Soil Map Unit	Project Acres	Proportion of Project Area	LCC	LCC Rating	LCC Score	Storie Index	Storie Index Score
206	CaD	5.69	.06	4s-5	40	2.4	46	2.76
200	Cc	1.44	.01	4w-5	40	.4	21	.21
205	CaB	12.78	.13	4s-5	40	5.2	48	6.24
205	CaB	.065	0	4s-5	40	0	48	0
220	AaA	81.22	.80	4e-5	50	40	43	34.4
	Totals	101.19	(Must Sum to 1.0)		***LCC Total Score***	48	***Storie Index Total Score***	43.61

Site Assessment Worksheet 1.

Project Size Score

	I	J	K
	LCC Class I - II	LCC Class III	LCC Class IV - VIII
			5.69
			1.44
			12.78
			.065
			81.22
Total Acres			101.19
Project Size Scores			40

Highest Project Size Score 40

NOTES

Calculation of the Site Assessment (SA) Score

Part 1. Project Size Score:.

(1) Using **Site Assessment Worksheet 1** provided on page 2-A, enter the acreage of each soil type from **Column B** in the **Column - I, J or K** - that corresponds to the LCC for that soil. (Note: While the Project Size Score is a component of the Site Assessment calculations, the score sheet is an extension of data collected in the Land Evaluation Worksheet, and is therefore displayed beside it).
(2) Sum **Column I** to determine the total amount of class I and II soils on the project site.
(3) Sum **Column J** to determine the total amount of class III soils on the project site.
(4) Sum **Column K** to determine the total amount of class IV and lower soils on the project site.
(5) Compare the total score for each LCC group in the Project Size Scoring Table below and determine which group receives the highest score.

Project Size Scoring Table

Class I or II		Class III		Class IV or Lower	
Acreage	Points	Acreage	Points	Acreage	Points
>80	100	>160	100	>320	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
10<	0	20-39	30	40<	0
		10-19	10		
		10<	0		

(6) Enter the **Project Size Score** (the highest score from the three LCC categories) in box <3> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Part 2. Water Resource Availability Score:

(1) Determine the type(s) of irrigation present on the project site, including a determination of whether there is dryland agricultural activity as well.

(2) Divide the site into portions according to the type or types of irrigation or dryland cropping that is available in each portion. Enter this information in **Column B** of **Site Assessment Worksheet 2. - Water Resources Availability**.

(3) Determine the proportion of the total site represented for each portion identified, and enter this information in **Column C**.

(4) Using the Water Resources Availability Scoring Table, identify the option that is most applicable for each portion, based upon the feasibility of irrigation in drought and non-drought years, and whether physical or economic restrictions are likely to exist. Enter the applicable Water Resource Availability Score into **Column D**.

(5) Multiply the Water Resource Availability Score for each portion by the proportion of the project area it represents to determine the weighted score for each portion in **Column E**.

(6) Sum the scores for all portions to determine the project's total Water Resources Availability Score

(7) Enter the Water Resource Availability Score in box <4> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 2. - Water Resources Availability

A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score	Weighted Availability Score (C x D)
1	not irrigated	1	25	25
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	***Total Water Resource Score***	25

Water Resource Availability Scoring Table

Option	Non-Drought Years			Drought Years			WATER RESOURCE SCORE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	– –	– –	50
9	YES	NO	YES	NO	– –	– –	45
10	YES	YES	NO	NO	– –	– –	35
11	YES	YES	YES	NO	– –	– –	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production feasible						0

LESA Worksheet (cont.)

NOTES

Within Zone of Influence there is currently no producing agricultural crops.

Part 3. Surrounding Agricultural Land Use Score:

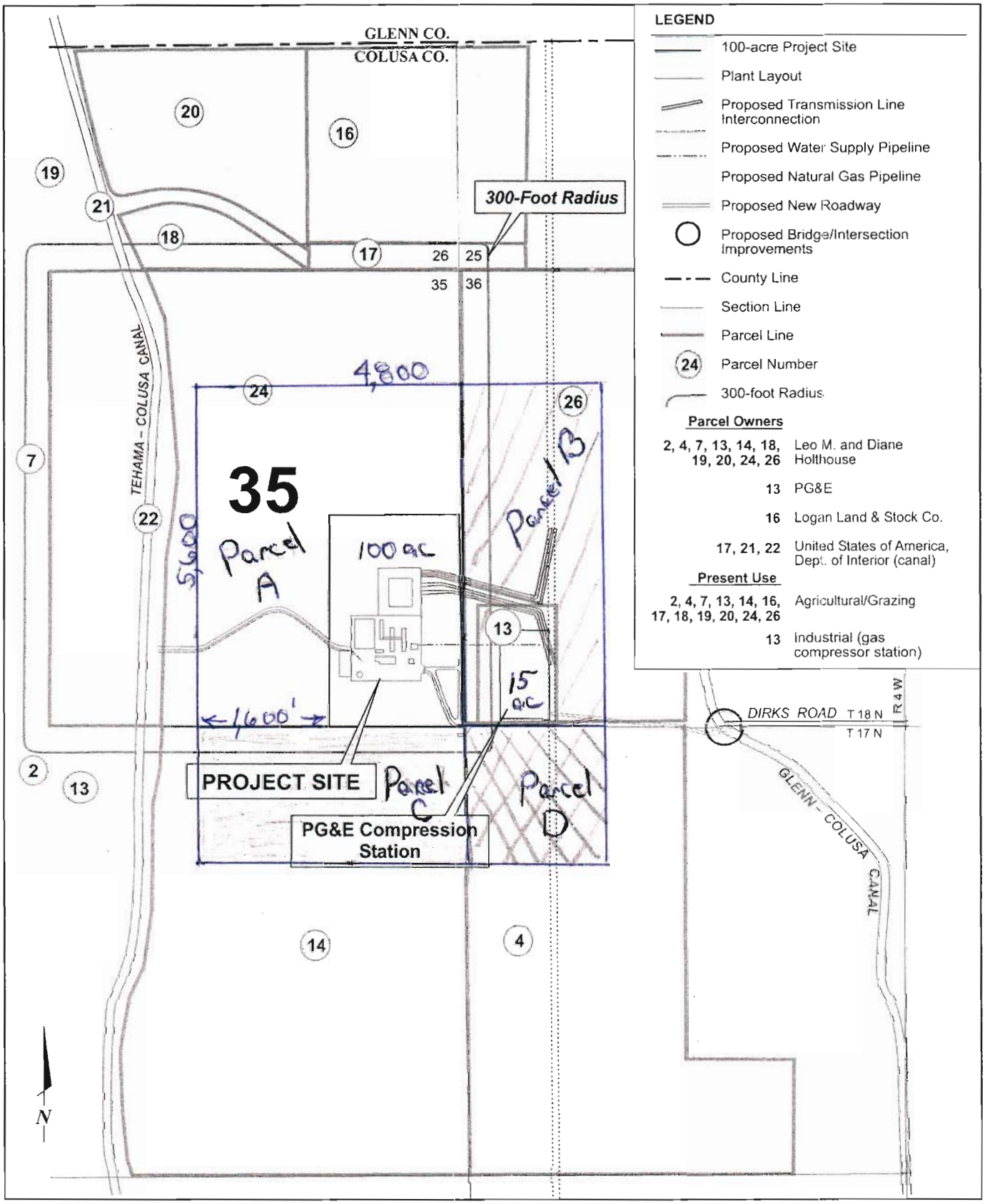
(1) Calculate the project's Zone of Influence (ZOI) as follows:
(a) a rectangle is drawn around the project such that the rectangle is the smallest that can completely encompass the project area.
(b) a second rectangle is then drawn which extends one quarter mile on all sides beyond the first rectangle.
(c) The ZOI includes all parcels that are contained within or are intersected by the second rectangle, less the area of the project itself.
(2) Sum the area of all parcels to determine the total acreage of the ZOI.
(3) Determine which parcels are in agricultural use and sum the areas of these parcels
(4) Divide the area in agriculture found in step (3) by the total area of the ZOI found in step (2) to determine the percent of the ZOI that is in agricultural use.
(5) Determine the Surrounding Agricultural Land Score utilizing the Surrounding Agricultural Land Scoring Table below.

Surrounding Agricultural Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

(5) Enter the Surrounding Agricultural Land Score in box <5> of the **Final LESA Score Sheet** on page 10-A.

Zone of Influence



Source:
Colusa County Assessor's Parcel Maps:
Bk. 11, pages 4, 14

0 1600 3200
Approximate Scale in Feet

300-FOOT RADIUS MAP AND LIST OF OWNERS
Colusa Generating Station

10/25/06 vsa ..\28067004 CPV Colusa\Land Use Application\300ft-radius_owners.cdr

Site Assessment Worksheet 3.
Surrounding Agricultural Land and Surrounding Protected Resource Land

A	B	C	D	E	F	G
Zone of Influence						
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (A/B)	Percent Protected Resource Land (A/C)	Surrounding Agricultural Land Score (From Table)	Surrounding Protected Resource Land Score (From Table)
617	0*	0	0	0	0	0

* No producing agricultural crops within Zone of Influence

NOTES

Part 4. Protected Resource Lands Score:

The Protected Resource Lands scoring relies upon the same Zone of Influence information gathered in Part 3, and figures are entered in Site Assessment Worksheet 3, which combines the surrounding agricultural and protected lands calculations.

(1) Use the total area of the ZOI calculated in Part 3. for the Surrounding Agricultural Land Use score.

(2) Sum the area of those parcels within the ZOI that are protected resource lands, as defined in the California Agricultural LESA Guidelines.

(3) Divide the area that is determined to be protected in Step (2) by the total acreage of the ZOI to determine the percentage of the surrounding area that is under resource protection.

(4) Determine the Surrounding Protected Resource Land Score utilizing the Surrounding Protected Resource Land Scoring Table below.

Surrounding Protected Resource Land Scoring Table

Percent of ZOI Protected	Protected Resource Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<20	0

(5) Enter the Protected Resource Land score in box <6> of the **Final LESA Score Sheet** on page 10-A.

LESA Worksheet (cont.)

NOTES

Final LESA Score Sheet

Calculation of the Final LESA Score:

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	<1> 48	0.25	12
Storie Index	<2> 43.61	0.25	10.90
LE Subtotal		***0.50***	***22.90***
SA Factors			
Project Size	<3> 40	0.15	6
Water Resource Availability	<4> 25	0.15	3.75
Surrounding Agricultural Land	<5> 0	0.15	0
Protected Resource Land	<6> 0	0.05	0
SA Subtotal		***0.50***	***9.75***
		Final LESA Score	32.65

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual

Section IV. California Agricultural LESA Scoring Thresholds - Making Determinations of Significance Under CEQA

A single LESA score is generated for a given project after all of the individual Land Evaluation and Site Assessment factors have been scored and weighted as detailed in Sections 2 and 3. Just as with the scoring of individual factors that comprise the California Agricultural LESA Model, final project scoring is based on a scale of 100 points, with a given project being capable of deriving a maximum of 50 points from the Land Evaluation factors and 50 points from the Site Assessment factors.

The California Agricultural LESA Model is designed to make determinations of the potential significance of a project's conversion of agricultural lands during the Initial Study phase of the CEQA review process. Scoring thresholds are based upon both the total LESA score as well as the component LE and SA subscores. In this manner the scoring thresholds are dependent upon the attainment of a minimum score for the LE and SA subscores so that a single threshold is not the result of heavily skewed subscores (i.e., a site with a very high LE score, but a very low SA score, or vice versa). Table 9 presents the California Agricultural LESA scoring thresholds.

Table 9. California LESA Model Scoring Thresholds

Total LESA Score	Scoring Decision
0 to 39 Points	Not Considered Significant
40 to 59 Points	Considered Significant only if LE and SA subscores are each greater than or equal to 20 points
60 to 79 Points	Considered Significant unless either LE or SA subscore is less than 20 points
80 to 100 Points	Considered Significant

LAND USE - FIGURE 1

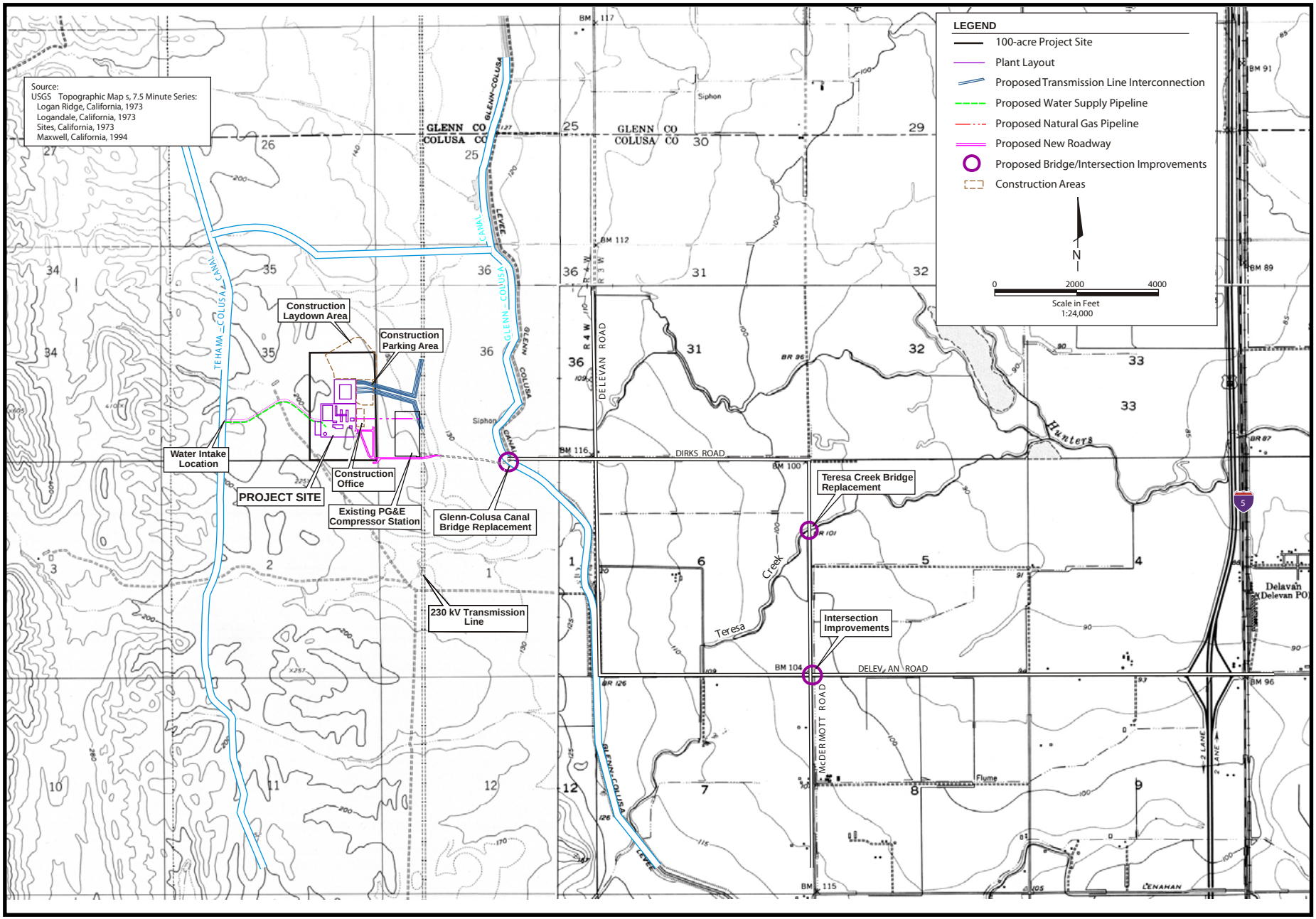
Colusa Generating Station - Aerial View of Project Site and Vicinity

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: Google Earth

LAND USE - FIGURE 2

Colusa Generating Station - Project Location Map



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 3.2-1

LAND USE - FIGURE 3

Colusa Generating Station - View of Project Site Looking North

JULY 2007

LAND USE

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: CEC Staff Photo taken 1/31/2007

Figure - 4a
View of PG&E Delevan Compressor Station East of Project Site

Figure - 4b
View to the East from Front of Project Site Location

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITY SITING DIVISION, JULY 2007
SOURCE: CEC Staff Photo taken 1/31/2007

LAND USE - FIGURE 5

Colusa Generating Station - View Looking West from the Project Site

JULY 2007

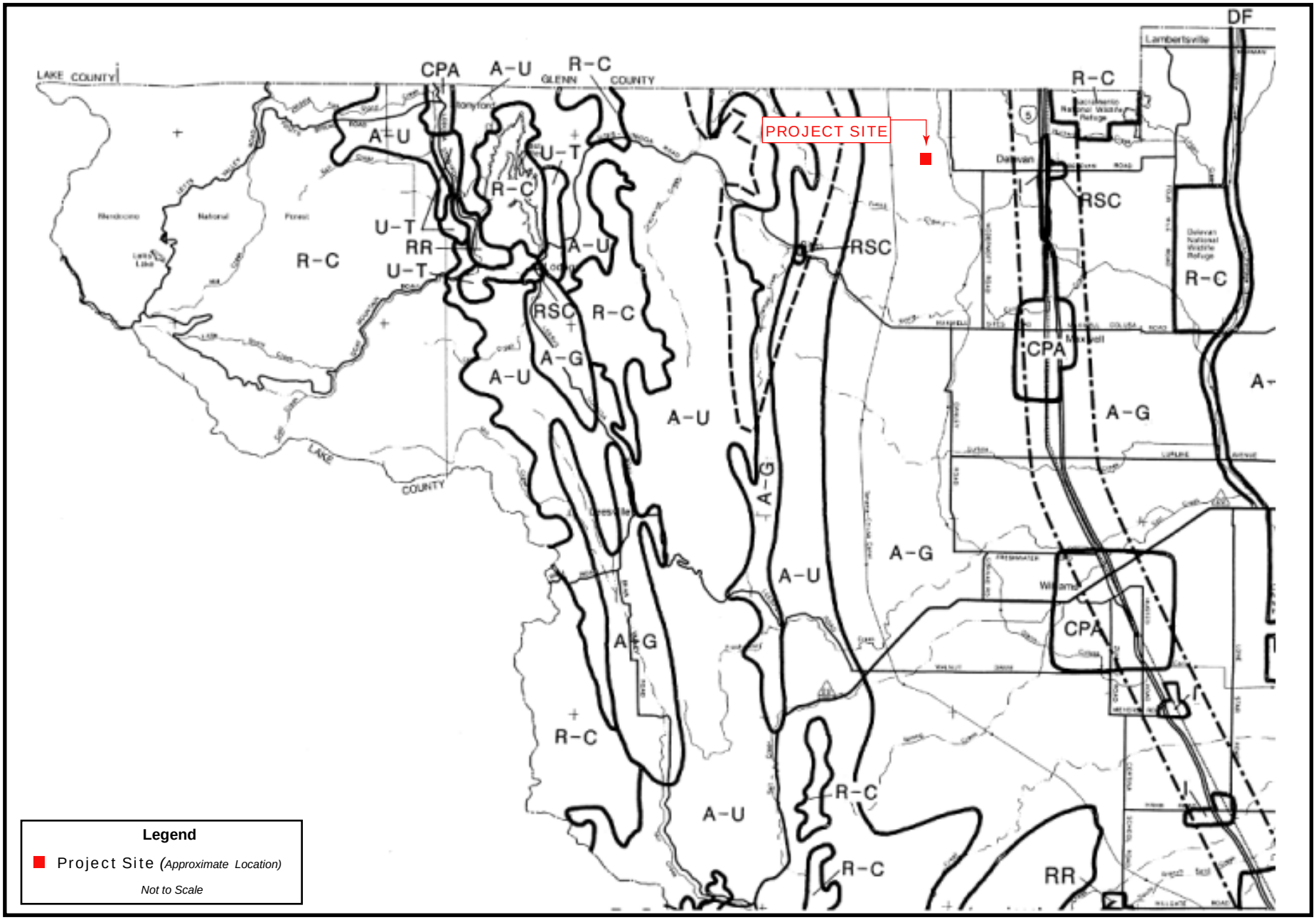
LAND USE

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: CEC Staff Photo taken 1/31/2007

LAND USE - FIGURE 6

Colusa Generating Station - Colusa County General Plan Map, 1989

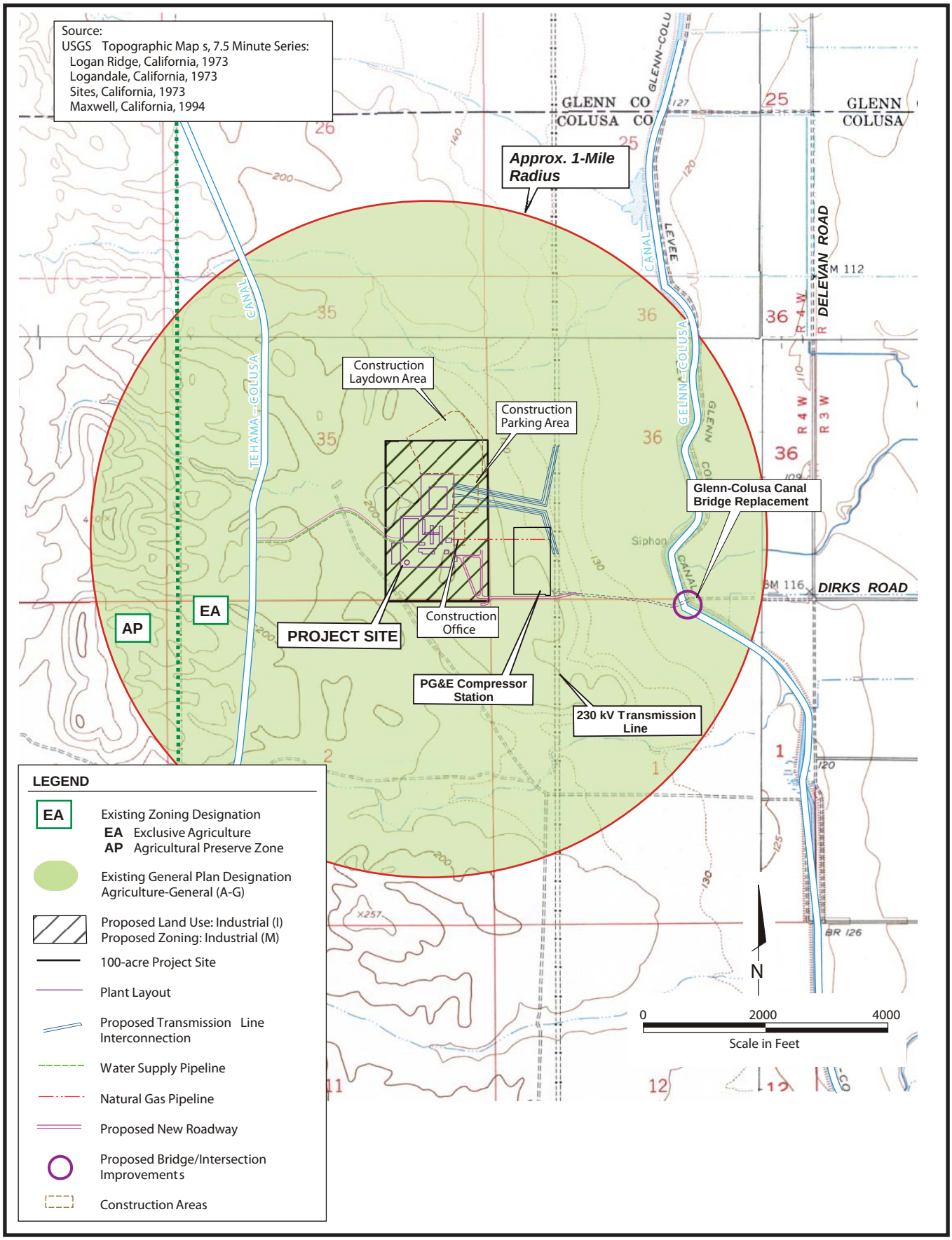


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: Colusa County General Plan, 1989

LAND USE - FIGURE 7

Colusa Generating Station - Land Use and Project Layout Map



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.4-3

NOISE AND VIBRATION

Steve Baker

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Colusa Generating Station Project (CGS) can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards. With the incorporation of the conditions of certification proposed below, noise and vibration from construction and operation of the CGS would result in no significant adverse impacts, directly, indirectly, or cumulatively.

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 CGS 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 Colusa County General Plan Safety Element	Sets land use compatibility standards for low density residential uses. Noise levels up to 55 dBA L_{dn} are normally acceptable; up to 65 dBA L_{dn} are conditionally acceptable
Colusa County Municipal Code Appendix I, Article 8, § 8.01(a)	Limits noise at nearest residential zoned property to 60 dB L_{dn}, or to 50 dBA L_{50} daytime and 45 dBA L_{50} nighttime, whichever is more restrictive
Glenn County General Plan § 6.10	Sets noise level standards of 50 dB L_{eq} daytime and 45 dB L_{eq} nighttime

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

Colusa County General Plan Safety Element

The Safety Element of the Colusa County General Plan (COC, 1989) requires compatibility between new land uses as shown in Table SAFE-3, which finds noise levels at low density residential receptors normally acceptable up to 55 dBA L_{dn} and conditionally acceptable up to 65 dBA L_{dn}. Conditionally acceptable means that mitigation measures could be employed to achieve acceptable noise levels.

Colusa County Municipal Code

Appendix I of the Colusa County Municipal Code (COC, 1991), Article 8, Development Standards, includes Section 8.01 (a), Noise. This section states that noise generated by a proposed use, as measured at the nearest residential zoned property, shall not exceed 60 dB L_{dn}, or shall not exceed 50 dBA L_{50} daytime and 45 dBA L_{50} nighttime, whichever is more restrictive.

Glenn County General Plan

Sensitive noise receptors near the project site include several dwellings to the north, in Glenn County. Section 6.10 of the Glenn County General Plan (COG, 1993) is entitled "Noise/Land Use Compatibility Guidelines and Noise Level Standards." This section requires that new proposed non-transportation noise sources be mitigated so as not to exceed a certain noise level standard, as measured immediately within the property line of the noise-sensitive use. This noise level standard, displayed in Table 6-1 of Section 6.10 of the General Plan, is 50 dB L_{eq} daytime and 45 dB L_{eq} nighttime.

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, including those receptors that are considered minority population.

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

[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.

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 is 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.

SETTING

The CGS would lie on a 31-acre site in the northern portion of Colusa County, approximately a mile south of the Glenn County line. The land is designated for general agricultural use, and the land surrounding the site is used for open space, cattle grazing and growing irrigated crops. Included in the project are replacement of the Glenn-Colusa Canal Bridge on Dirks Road, approximately one-half mile east of the site and replacement of the Teresa Creek Bridge on McDermott Road, approximately two miles east of the site (E&L, 2006a, AFC §§8.5.1.2, 8.5.2.1).

The ambient noise regime in the project vicinity consists chiefly of agricultural operations and operation of the Pacific Gas and Electric Company (PG&E) natural gas compressor station adjacent to the east side of the project site (E&L, 2006a, AFC §§8.5.1.2, 8.5.1.3). The nearest sensitive noise receptors are two rural residences approximately 1.7 miles east-southeast of the project site; another rural residence approximately 2.3 miles north of the site; and three residences approximately 2 miles north-northeast of the site (E&L, 2006a, AFC §§8.5.1.2, 8.5.1.3; Fig. 8.5-1).

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 (E&L, 2006a, AFC §8.5.1.3; Tables 8.5-2, 8.5-3, 8.5-4; URS, 2006a). The survey was performed on March 13 and 14, 2001. This survey is considered valid because land uses in the project vicinity have not changed in the intervening years. The noise survey monitored existing noise levels at the following locations, shown on **NOISE AND VIBRATION - Figure 1**:

1. Measuring Location ML1: Near two farm dwellings approximately 1.7 miles east-southeast of the project site. This location was monitored continuously from 6:00 p.m. on March 13, 2001, through 7:00 p.m. on March 14, 2001. Primary noise sources were vehicular traffic and operation of farm equipment.

2. Measuring Location ML2: A single home on ranch property approximately 2.3 miles north of the project site. This location was monitored continuously from 11:00 p.m.

on March 13, 2001, through midnight on March 14, 2001. Primary noise sources were vehicular traffic and operation of farm equipment.

3. Measuring Location ML3: The southeastern corner of the project site. This location was monitored for two one-hour periods, in daytime and nighttime, from 4:00 p.m. to 5:00 p.m. and from 10:35 p.m. to 11:35 p.m. on March 13, 2001. The primary noise source was the PG&E natural gas compressor station.

4. Measuring Location ML4: The northwestern corner of the project site. This location was monitored for two one-hour periods, in daytime and nighttime, from 4:40 p.m. to 5:40 p.m. and from 10:50 p.m. to 11:50 p.m. on March 13, 2001. The primary noise source was the PG&E natural gas compressor station.

Not monitored were the three residences at RC1, approximately two miles north-northeast of the site; see **NOISE AND VIBRATION Figure 1**, below.

In general, the noise environment in the vicinity of the sensitive receptors is dominated by vehicular traffic and farm equipment operation. The noise environment near the project site is dominated by the gas compressor station.

NOISE Table 2 summarizes the ambient noise measurements (E&L, 2006a, AFC §8.5.1.3; Tables 8.5-2, 8.5-3, 8.5-4):

NOISE Table 2
Summary of Measured Ambient Noise Levels

Measurement Locations	Measured Noise Levels, dBA					
	L_{eq}		L_{50}		L_{90}[1]	L_{dn}
	Daytime	Nighttime	Daytime	Nighttime	Nighttime	
ML1 – Farm dwellings to ESE of site	51.2[2]	35.7[3]	42.5[2]	36.4[3]	30.7	54.3
ML2 – Ranch dwelling to N of site	45.0[2]	37.2[3]	43.4[2]	36.8[3]	32.2	51.5
ML3 – SE corner of project site[4]	64.0	67.3	63.9	67.2	66.2	—[5]
ML4 – NW corner of project site[4]	47.5	46.9	47.2	46.8	44.3	—[5]

Source: E&L, 2006a, AFC Tables 8.5-2, 8.5-3, 8.5-4.
[1] Staff calculations of average of four quietest consecutive hours of the nighttime
[2] Staff calculations of average of 15 daytime hours
[3] Staff calculations of average of nine nighttime hours
[4] One-hour samples
[5] L_{dn} not available because monitoring did not encompass a 24-hour period

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 CGS is expected to last 24 months, typical of other combined cycle power plants in

terms of schedule, equipment used, and other types of activities (E&L, 2006a, AFC §§ 1.1, 1.6).

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. However, no LORS specifically address construction noise of the CGS; therefore, staff does not attempt to evaluate LORS compliance.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

The applicant has predicted power plant construction noise based on generally accepted values (E&L, 2006a, AFC Fig. 8.5-2). Aggregate construction noise can be expected to reach levels of 85 to 90 dBA L_{eq} at a distance of 50 feet from the source. Extrapolating this to the nearest receptors, the residences at ML1 (nearly 9,000 feet away), yields noise levels of 40 to 45 dBA. At the more distant residence at ML2 (approximately 12,000 feet distant), construction noise can be expected to attenuate to levels of 37 to 42 dBA. Comparing projected noise levels to the ambient noise levels at ML1 and ML2 (see **NOISE Table 3**, below) shows increases during daytime of one and two dBA respectively. Noise levels at the residences at RC1 are expected to be at or below those at ML2 (E&L, 2006a, AFC §8.5.2.2). Such increases are barely noticeable and are clearly insignificant. Increases over nighttime ambient noise levels, however, would be approximately 10 and 6 dBA at ML1 and ML2, respectively. Such increases are clearly audible, and at night, when people are sleeping, would typically be considered annoying.

NOISE Table 3: Predicted Power Plant Construction Noise Levels

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
ML1 – Farm dwelling to SE of site	45	51 daytime	52 daytime	+1 daytime
		36 nighttime	46 nighttime	+10 nighttime
ML2 – Ranch dwelling to N of site	42	45 daytime	47 daytime	+2 daytime
		37 nighttime	43 nighttime	+6 nighttime

1 Source: E&L 2006a, AFC Figure 8.5-2; and staff calculations.
2 Source: E&L 2006a, AFC Tables 8.5-2 and 8.5-3; staff calculations of average of daytime and nighttime hours.

The applicant does not commit to limiting noisy construction work to daytime hours. In order to avoid annoyance, staff proposes such a limit. Proposed Condition of Certification **NOISE-6**, below, would restrict noisy construction to the hours between 6:00 a.m. and 7:00 p.m.

In the event that actual construction noise should annoy nearby workers or residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process and a Noise Complaint Process that requires the applicant to resolve any problems caused by construction noise.

Bridge Replacements

The project includes replacement of two bridges near the project site to enable truck delivery of the larger power plant components. These are the Teresa Creek Bridge, approximately two miles east of the project site on McDermott Road between Delevan Road and Dirks Road, and the Glenn-Colusa Canal Bridge, approximately one mile east of the site on Dirks Road.

The applicant predicts that construction noise from these replacements will reach typical levels of 90 dBA at 50 feet. The nearest residences to the Teresa Creek Bridge, at ML1, lie approximately 3,500 feet (two-thirds' mile) distant. These same residences are the sensitive receptors nearest the Glenn-Colusa Canal Bridge; they lie approximately 4,700 feet (nine-tenths' mile) away. Expected noise levels from this bridge replacement work are shown in **NOISE Table 4**:

NOISE Table 4: Predicted Bridge Replacement Noise Levels at ML1

Noise Source	Highest Construction Noise Level[1] (dBA L_{eq})	Existing Ambient at ML1[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
Teresa Creek Bridge Replacement	53	51 daytime	55 daytime	+4 daytime
		36 nighttime	53 nighttime	+17 nighttime
Glenn-Colusa Canal Bridge Replacement	51	51 daytime	54 daytime	+3 daytime
		36 nighttime	51 nighttime	+15 nighttime

[1] Source: E&L, 2006a, AFC § 8.5.2.1; and staff calculations.
[2] Source: E&L, 2006a, AFC Tables 8.5-2 and 8.5-3; and staff calculations of average of daytime and nighttime hours.

Bridge replacement work during the daytime would result in increases in ambient noise levels of only three to four dBA at ML1, a noticeable but not annoying impact. Were this work conducted at night, the noise level increases of 15 to 17 dBA would likely prove extremely annoying. Staff has therefore proposed Condition of Certification **NOISE-6** to preclude noisy work at night.

Linear Facilities

New off-site linear facilities would include a 1,500-foot-long natural gas pipeline interconnecting with the PG&E gas compressor station to the east of the project site, a 2,700-foot-long water line connection to the Tehama-Colusa Canal west of the site, and an 1,800-foot-long connection to the existing PG&E 230-kV transmission line east of the site (E&L, 2006a, AFC §§ 1.4, 1.8, 1.9, 1.19; Figs. 3.2-1, 3.3-1).

The linears are all adjacent to the project site, so their construction noise impacts will be similar to those of the power plant itself. Limiting noisy construction to daytime hours should provide adequate mitigation of impacts. To ensure compliance with this restriction, staff proposes Condition of Certification **NOISE-6**.

Pile Driving

The applicant does not discuss whether pile driving would be necessary for construction of the CGS. Were pile driving required for construction of the CGS, 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 59 dBA at ML1, the nearest residential receptors (staff calculation). Added to the existing daytime ambient level of 51 dBA L_{eq}, this would combine to produce 60 dBA, an increase of 9 dBA over the ambient level. Pile driving noise would likewise reach levels of 56 dBA at the residence at ML2, combining with the daytime ambient noise level of 45 dBA to produce 56 dBA, an increase over ambient of 11 dBA (see **NOISE Table 5** below). 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 impacts that are tolerable to residents. Staff proposes Condition of Certification **NOISE-6** to ensure that pile driving noise, should it occur, is limited to the 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)
ML1	59	51	60	+9
ML2	56	45	56	+11

Source: Application for Certification, Vernon Power Plant Project (06-AFC-4), Table 8.5-10; and staff calculations.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the heat recovery steam generator or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a "high pressure 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 lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

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 84 dBA at ML1, the nearest sensitive receptor. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet; this would yield approximately 44 dBA at ML1 and 41 dBA at ML2.

The noise from an unmuffled high pressure steam blow would violate both the Colusa County and Glenn County LORS limit of 50 dBA daytime; a silenced blow would not and, in fact, would be barely noticeable compared to the daytime ambient noise levels (see **NOISE Table 6** below).

A newer, quieter steam blow process, referred to as low pressure steam blow and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of 36 hours or so. Resulting noise levels reach about 80 dBA at 100 feet; such a process would yield noise levels at ML1 of approximately 41 dBA and at ML2 of approximately 38 dBA. This would comply with the applicable LORS.

Noise from a low pressure continuous steam blow at ML1, 10 dBA greater than the nighttime ambient background level, would likely be annoying. Low pressure steam blow noise would exceed the nighttime ambient background level at ML2 by seven dBA, likely causing some annoyance. Such noise would likely disturb people trying to sleep and would constitute a significant impact. For this reason, staff recommends that low pressure steam blows, which must continue through the night, not be allowed during CGS construction.

NOISE Table 6
Steam Blow Noise Impacts

Receptor	High Pressure Steam Blow Noise Level (muffled) (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})[1]	Cumulative Level (dBA L_{eq})	Change (dBA)
ML1	44	51	52	+1
ML2	41	45	46	+1
Receptor	**Low Pressure Steam Blow Noise Level (dBA L_{eq})**	**Nighttime Ambient Noise Level (dBA L_{90})[1]**	**Cumulative Level (dBA L_{eq})**	**Change (dBA)**
ML1	41	31	41	+10
ML2	38	32	39	+7

[1] See **NOISE Table 2**, above

In order to ensure that steam blow noise does not exceed LORS limits or produce significant adverse impacts, staff has proposed Condition of Certification **NOISE-7** below.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. 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.

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 (E&L, 2006a, AFC §8.7.3.1; Tables 8.7-1, 8.7-2, 8.7-4, 8.7-5). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of the CGS include the gas turbine generators, gas turbine air inlets, heat recovery steam generators and their exhaust stacks, steam turbine, air cooled condenser fans, electrical transformers, and various pumps and fans (E&L, 2006a, AFC §8.5.2.2). 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.

The applicant included the following noise mitigation measures in performing computer modeling of noise impacts from project operation (E&L, 2006a, AFC §8.5.2.2):

- metal acoustical gas turbine enclosures;
- inlet air filter silencers;
- exhaust stack silencers;
- accessory compartment enclosures;
- vent stack silencers;
- vent stack acoustical lagging;
- acoustical barrier walls around exhaust diffusers and ducts; and
- acoustically absorptive ground plane under air cooled condenser.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (E&L, 2006a, AFC §8.5.2.2). Project operating noise at ML1 (the nearest noise-sensitive residences, 9,000 feet east of the project site) is predicted to be approximately 44 dBA L_{dn} and at ML2 (a residence 12,000 feet north of the site), approximately 46 dBA L_{dn}. As stated above, noise levels at the residences at RC1 are

expected to be at or below those at ML2. These figures all comply with the respective LORS limits; see **NOISE Table 7**.

NOISE Table 7: Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	Projected Noise Level[3]
ML1	Colusa County General Plan Safety Element	55/65[1] dBA L_{dn}	44 dBA L_{dn}
	Colusa County Municipal Code	60 dBA L_{dn}, or 45 dBA L_{50} nighttime	
ML2	Glenn County General Plan	45 dB L_{eq} nighttime[2]	46 dBA L_{dn}

[1] 55 dBA is Normally Acceptable, 65 dBA is Conditionally Acceptable
[2] For a steady, unvarying noise source such as a power plant, 45 dB L_{eq} is equivalent to 51 dBA L_{dn}
[3] Source: E&L, 2006a, AFC § 8.5.2.2, Table 8.5-6

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the daytime levels; differences of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level.

For a steady, relatively unvarying noise source such as a power plant, the L_{eq} value is approximately six dBA lower than the L_{dn} value. Using the applicant's estimates of L_{dn} values (see **NOISE Table 7** above), plant noise levels at ML1 would be 38 dBA L_{eq}, and at ML2 would be 40 dBA L_{eq}. The applicant further states that plant L_{90} (background) noise levels are typically 1.5 dBA lower than the L_{eq} values. Staff does not dispute this characterization. Subtracting this value from the L_{eq} values yields plant L_{90} levels of 36.5 dBA at ML1 and 38.5 dBA at ML2; see **NOISE Table 8**:

NOISE Table 8
Power Plant Noise Impacts at Sensitive Receptors

Receptor	Power Plant Noise Level, dBA L_{90}[1]	Ambient Background Level, dBA L_{90}[2]	Cumulative Noise Level, dBA	Change from Ambient Background Level
ML1	36.5	30.7	37.5	+7
ML2	38.5	32.2	39.5	+7

[1] Source: E&L, 2006a, AFC §8.5.2.2, Table 8.5-7; and staff calculations.
[2] Source: E&L, 2006a, AFC Tables 8.5-2, 8.5-3; and staff calculations of average of four quietest consecutive nighttime hours.

As explained above, when evaluating noise impacts on residences, staff compares project noise to the average of the four quietest consecutive nighttime hours. At ML1, this is the span from 1:00 to 5:00 a.m. (see AFC, Table 8.5-2), and at ML2, from midnight to 4:00 a.m. (see AFC, Table 8.5-3). These values are 30.7 dBA L_{90} at ML1 and 32.2 dBA L_{90} at ML2 (see **NOISE Table 8**).

When projected plant noise is added to ambient values (as calculated by staff), the cumulative levels are seven dBA above the ambient values at ML1 and ML2 (see **NOISE Table 8**). These increases are within the range that staff considers a potentially significant adverse impact.

An increase in the noise level at a residence of seven dBA during the quietest hours of the nighttime might be expected to constitute an annoyance during the mild seasons of the year, when people commonly sleep with windows open. When the weather is less mild (cold in winter, or hot enough in summer to cause people to run their air conditioners all night long), such an increase would likely not be annoying and might be unnoticeable. When the number of residences potentially affected is small (two at ML1 and one at ML2), staff typically does not suggest further mitigation to quiet the power plant, as such mitigation is extremely costly. Rather, staff commonly proposes a condition of certification requiring the project owner to offer noise mitigation measures at the affected residences, should the residents request it. Such mitigation can include upgrading the dwelling with double-pane windows and solid core exterior doors, installing exterior wall insulation, installing air conditioning if it is not already in place, or erecting a sound wall near the residence. Staff recommends such an approach in this case; see proposed Condition of Certification **NOISE-8** below.

Tonal Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (E&L, 2006a, AFC §8.5.2.2). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

All water and 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 (E&L, 2006a, AFC §3.9.2.2, Table 3.9-1).

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas and steam turbine generators, 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. The applicant explains in the AFC that typical gas turbine generator facilities have not resulted in groundborne vibration impacts farther than 300 feet from the power plant (E&L, 2006a, AFC §8.5.2.2). Based on experience with numerous previous projects employing similar equipment, Energy Commission staff agrees with this conclusion and agrees with the applicant that groundborne vibration from the CGS 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 applicant explains in the AFC that airborne vibration impacts from a plant such as the CGS are typically imperceptible 1,000 feet from the plant (E&L, 2006a, AFC §8.5.2.2). The CGS's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the CGS, however, the exhaust must pass through the heat recovery steam generators (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 CGS 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 (E&L, 2006a, AFC §8.7.3.2, Table 8.7-1). 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**.

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.

Staff is aware of only one project in the region that could combine with the CGS to create cumulative impacts: a potential development of an 18-unit subdivision near Maxwell, approximately five miles southeast of the project site. Noise does not travel far enough to cause cumulative impacts from two projects so widely separated. Staff

therefore believes that there would be no cumulative noise impacts involving the CGS during construction or operation.

FACILITY CLOSURE

In the future, upon closure of the CGS, all operational noise from the project would cease, and no further adverse noise impacts from operation of the CGS 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

Energy Commission staff believes that noisy construction work might present significant adverse impacts if performed at night and that plant operation could potentially annoy the nearest residents. Staff has proposed conditions of certification below in order to ensure that the applicant restricts noisy construction to permissible hours and properly addresses any noise complaints from nearby residents.

The CGS, if built and operated in conformance with these proposed conditions of certification, would comply with all applicable noise and vibration LORS for both operation and construction and would produce no significant adverse noise impacts on people within the affected 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 and one-half miles of the site and one-half 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 CGS, 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 complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the 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 operation of the project will not cause noise levels due to plant operation to exceed an average of 38 dBA L_{eq} measured at monitoring location ML1 and an average of 40 dBA L_{eq} at monitoring location ML2. No new pure-tone components may 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.

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 residential locations to determine the presence of pure tones or other dominant sources of plant noise.

A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring locations ML1 and ML2 or at closer locations acceptable to the CPM. This survey shall be performed during power plant operation and shall also include measurement of one-third octave band sound pressure levels to determine whether new pure-tone noise components have been caused by the project.

B. If the results from the noise survey indicate that the power plant average noise level (L_{eq}) at any affected receptor site exceeds the above value, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

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's first achieving a sustained output of 80 percent 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 will 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.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations Sections 5095–5099 and Title 29, Code of Federal Regulations Section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Any Day	6:00 a.m. to 7:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. 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.

STEAM BLOW RESTRICTIONS

NOISE-7 The project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet. The project owner shall conduct steam blows only during the hours of 6:00 a.m. to 7:00 p.m.

Verification: At least fifteen (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 the noise levels expected and a description of the steam blow schedule.

NOISE-8 In the event legitimate noise complaints under Condition of Certification **NOISE-2** are made by the owners or occupants of any of the existing residences located at ML1, ML2, or RC1 during operation of the CGS, the project owner shall offer to pay for the following noise attenuating upgrades to the residences:

- exterior sound barriers;
- replacement of single-pane windows with dual-pane windows;
- replacement of hollow-core exterior doors with solid-core doors and weather stripping;
- air conditioning (if not already present); and/or
- additional sound insulation in exterior walls.

The owner of each residence may select any or all of the above upgrades that the residence owner decides—in his or her sole discretion, but after consulting with the project owner—are appropriate. The residence owner and the project owner shall select a mutually acceptable contractor to perform the upgrades. The project owner shall pay the cost of the upgrades.

A “legitimate complaint” refers to a noise caused by the CGS project, as opposed to another source, as verified by the CPM. A legitimate complaint constitutes either: a violation by the project of any noise condition of certification, which is documented by another individual or entity affected by such noise; or a minimum of three complaints over a 24-hour period that are confirmed by the CPM, the project owner, or any local or state agency that would, but for the exclusive jurisdiction of the Energy Commission, otherwise have the responsibility for investigating noise complaints or enforcing noise

Verification: Upgrades shall, unless impossible due to circumstances beyond the project owner’s control, be installed within six months of the receipt of the complaint. In the first annual compliance report after the receipt of a complaint, the project owner shall include documentation certifying that: 1) the noise-attenuating upgrades were installed on the specified residence at the project owner’s expense; 2) the noise attenuating upgrades were already a feature of the residence; 3) installation was offered but refused by the owner; or 4) residential use by the complainant was ceased. In the event noise-attenuating upgrades are not complete at the time the annual compliance report is issued, the report shall include a schedule for the completion of the upgrades and the documentation listed above shall be included in the next annual compliance report.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Colusa Generating Station Project
(06-AFC-9)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

COC (County of Colusa). 1989. Colusa County General Plan. Adopted January 13, 1989.

COC (County of Colusa). 1991. Colusa County Municipal Code, Appendix I. Adopted June 18, 1991.

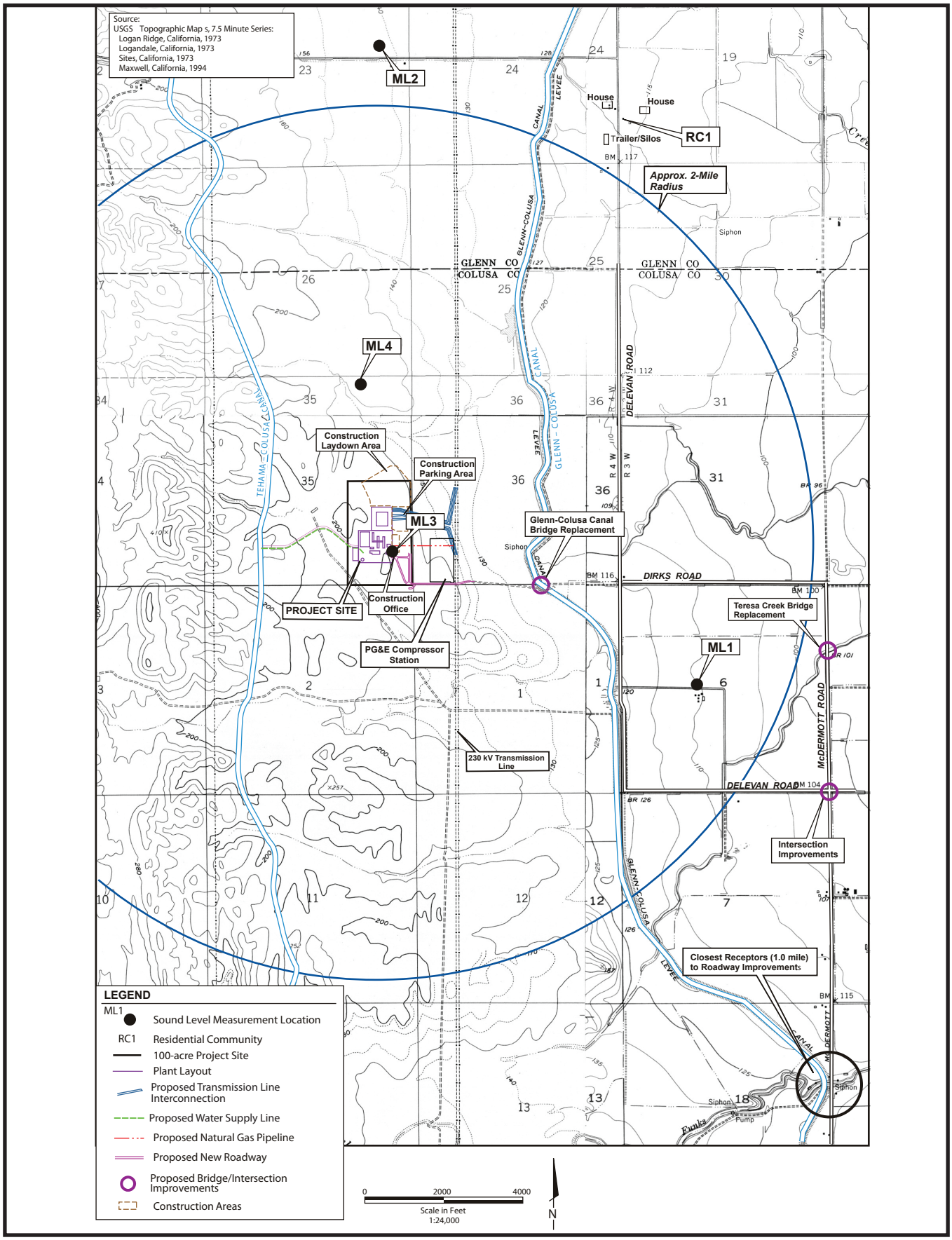
COG (County of Glenn). 1993. Glenn County General Plan. Adopted June 1993.

E&L2006a - E&L, LLC / A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

URS. 2006a. URS/A. Walsh (tn:38617). Supplement in response to the CEC data adequacy review. Submitted to CEC/J. Caswell/Docket Unit in 12/12/06.

NOISE AND VIBRATION - FIGURE 1

Colusa Generating Station - Sound Level Measurement Locations



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, MARCH 2007

SOURCE: AFC Figure 8.5-1

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 (Effects of Noise on People, U.S. Environmental Protection Agency, 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 one dB cannot be perceived.

2. Outside of the laboratory, a three-dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A 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 three-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three 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 six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, 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.

PUBLIC HEALTH

Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Colusa Generating Station (CGS) project and does not expect any significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed CGS uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the CGS would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Preliminary Staff Assessment (PSA) is to determine if toxic emissions from the proposed CGS would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

PUBLIC HEALTH Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code Section 7412)	This act requires new sources which emit more than 10 tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code Section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Public Resource Code Section 25523(a); Title 20 California Code of Regulations (CCR) Section 1752.5, 2300-2309; and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, H&SC Section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants.
Local	
Colusa County Air Pollution Control District Rule 3.18	This rule requires use of Toxic Best Available Control Technology for major sources of air pollution.
Colusa County Air Pollution Control District Rule 4.10	This rule requires payment of annual fees for the Air Toxic "Hot Spots" (AB2588).

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Characteristics of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density,

which, in turn, affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination. The area surrounding the project is rural and sparsely populated, primarily dedicated to agricultural uses.

SITE AND VICINITY DESCRIPTION

Land uses in the vicinity of the proposed project are predominantly designated for general agricultural use (E&LW, 2006a Section 8.4.1.2). The natural gas pipeline proposed for construction for this project will be 1,500 feet long and will run east-west on the east side of the project site. The nearest residence is located approximately 1.7 miles from the site. There are several sensitive receptors in the vicinity of the project site; a school located approximately three miles from the proposed CGS project and 8 residences near or within a three-mile radius of the site (E&LW, 2006a Section 8.6.1).

The CGS stack would be 175 feet high (E&LW, 2006a Section 8.6.1), underscoring the importance of considering the location of elevated terrain (above the power plant stack height) in assessing potential exposure. An emission plume may impact high elevations before impacting lower elevations. The site topography itself is rolling hills ranging from 170 to 190 feet above sea level (E&LW, 2006a Section 8.1.1). Terrain above stack height (about 360 feet above sea level) in the vicinity is shown in Figures 8.1-1A and 8.1-1B of the Application for Certification (AFC) and lies about a mile to the west.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced, and localized exposure may be increased.

Colusa County is part of the Sacramento Valley, which is surrounded by mountain ranges and has a moderate Mediterranean climate. The region is characterized by hot, dry summers and cool, rainy winters (E&LW, 2006a Section 8.1.1.1). Winters are intermittently dominated by the North Pacific storm track, with periods of dense, low-level fog that can persist for up to a week at a time. Summer temperatures can be quite hot, at times above 100^{o}F during the day, often cooling at night due to marine air from the San Francisco Bay and Delta areas. The mountain ranges surrounding the basin result in limited airflow that becomes blocked vertically by high barometric pressure systems.

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Colusa County Air Pollution Control District. By examining average toxic concentration levels from representative air monitoring sites in the project vicinity with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States is about 1 in 3, or 333,000 in 1 million (E&LW, 2006a Section 8.6.2.7).

The air quality monitoring station closest to the proposed project is the Colusa-Sunrise Boulevard Station, approximately 20 miles from the project site. Other monitoring stations in the project vicinity include the Yuba City–Almond Street Station (located approximately 38 miles away) and the Sacramento–Del Paso Manor station (approximately 65 miles away). Data from all three stations were used to calculate background concentrations for the CGS site because the closest monitoring station does not measure all criteria pollutants.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years. For example, in the Bay Area, cancer risk was 342 in 1 million based on 1992 data, 315 in 1 million based on 1994 data, and 303 in 1 million based on 1995 data. In 2002, the most recent year for which data is available, the average inhalation cancer risk decreased to 162 in 1 million (BAAQMD, 2004b, p. 12).

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff conducts a detailed study and analysis of existing public health issues in the project vicinity. This analysis is prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed project. Assessing existing health concerns in the project area will provide staff with a basis on which to evaluate the significance of any additional health impacts from the proposed CGS project and evaluate any proposed mitigation. No existing health issues have been reported within a six-mile radius of the project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The **PUBLIC HEALTH** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called “noncriteria pollutants.” Unlike criteria pollutants such as ozone, carbon

monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

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

- identify the types and amounts of hazardous substances that the CGS could emit to the environment;
- estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- using health-based standards designed to protect the most sensitive members of the population (that is, the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA, 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA, 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively

high concentrations of pollutants. Acute effects are temporary in nature and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 to 100 percent of a lifetime, or from 8 to 70 years (OEHHA, 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called “reference exposure levels,” or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA, 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA, 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors” and established by the California Office of Environmental Health Hazard Assessment - OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The

conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks. This more detailed analysis will also include a specific analysis to determine if a significant disproportional impact to a minority or low income population exists.

Significance Criteria

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

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

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a “hazard index.” A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations Section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of 10 in 1 million, or $10x10^{-6}$. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, these air districts would not approve a project with a

cancer risk exceeding 10 in 1 million. The Colusa County Air Pollution Control District does not have a toxic air contaminant risk management rule.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off site through soil erosion, and uncovering buried hazardous substances. A Phase I Environmental Site Assessment (ESA) conducted for this site in 2001 and updated in 2006 identified 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 any other environmental concern that would require remedial action (E&LW, 2006a, Appendix N). In the event that any unexpected contamination is encountered during construction, proposed conditions of certification **Waste-1** and **Waste-2** (which require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil) would ensure that contaminated soil does not affect the public. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide,

and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

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

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 micrograms of diesel particulate matter per cubic meter of air ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP, 1998, p. 6).[1] The SRP did not recommend a value for an acute REL since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of CGS is anticipated to take place over a period of 24 months, including site preparation. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from 8 to 70 years.

Appendix A1 of the Applicant's Response to Workshop Questions (L&W, 2007b) presents diesel exhaust emission factors and hourly emissions from construction equipment. Appendix A2 of the same document and Revised Table 8.1-10 present hourly, monthly, and yearly emissions of particulate matter less than 10 microns (PM10) and particulate matter less than 2.5 microns (PM2.5) for the construction phase. Revised Table 8.1-11 presents estimated peak PM10 emissions during construction (L&W, 2007b, Response to Data Request #36). The applicant estimated worst-case emissions of 2.2 lb per hour of PM10 and 2.2 lb per hour of PM2.5 during construction. Estimated total PM10 emissions during the periods of time where the wind or vehicle movement will generate dust (termed "fugitive" dust) are estimated to be the greatest are 16.9 lb per hour (L&W, 2007b, Response to Data Request #36, Table 8.1-11).

Modeling of construction activities including impacts of fugitive dust over a 12-month period resulted in a predicted annual average concentration of 3.33 $\mu g/m^3$ of PM10 and 0.69 $\mu g/m^3$ of PM2.5 at any location. Annual background concentrations of PM10 and PM2.5 measured in the vicinity of the CGS site are 25.5 $\mu g/m^3$ and 11 $\mu g/m^3$ respectively (L&W, 2007b, Response to Data Request #21, Revised Table 8.1-24).

[1]The SRP, established pursuant to California Health and Safety Code Section 39670, evaluates the risk assessments of substances proposed for identification as "Toxic Air Contaminants" by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.

Mitigation measures are proposed by both the applicant and Commission staff to reduce the maximum calculated PM10 emissions. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90 percent reductions of emissions.

The applicant has proposed several mitigation measures to reduce construction equipment exhaust emissions (E&LW, 2006a Section 8.1.5.10.2.3). In order to further mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Commission staff recommends the use of ultra low sulfur diesel fuel **and** Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst **and** soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85–92 percent. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed CGS include two gas turbines, an auxiliary boiler, an emergency diesel fire pump, and an emergency diesel generator. As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Since the facility uses dry cooling, there are no emissions of metals or volatile organic compounds from cooling tower mist or drift. Also, there is no hazard posed by the potential presence of Legionella bacteria.

Table 8.6-2 of the Application for Certification (AFC) lists noncriteria pollutants that may be emitted from CGS turbines as combustion byproducts, along with their anticipated amounts (emission factors). Emission factors are from the California Air Toxics Emission Factors (CATEF II) database (ARB, 2001). Table 8.6-1 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include RELs, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA, 2003). **PUBLIC HEALTH Table 2** lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but if inhaled, may have cancer and chronic (long-term) noncancer health effects but not acute (short-term) effects.

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				✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Diesel Exhaust			✔	✔	
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Napthalene		✔	✔	✔	
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔

Source: OEHHA, 2003, Appendix L and E&LW, 2006a, Table 8.6-1

Emissions Levels

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

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant’s screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother’s milk.

The above method of assessing health effects is consistent with OEHHA’s Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003) referred to earlier and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the project, including combustion and non-combustion emissions, resulted in a maximum acute total hazard index (THI) of 0.4205, located at the western property boundary, and a maximum chronic THI of 0.03055, located 2.5 kilometers northwest of the project site. The maximum acute and chronic THIs calculated at a residence are 0.0390 and 0.00074, respectively (E&LW, 2006a Section 8.6.2.8). As **PUBLIC HEALTH Table 3** shows, both acute and chronic hazard indices are under the REL of 1.0, indicating that no short- or long-term adverse health effects are expected.

PUBLIC HEALTH Table 3
Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.4205	1.0	No
Chronic Noncancer	0.03055	1.0	No
Individual Cancer	1.194 in 1 million	10.0×10^{-6}	No

Source: E&LW, 2006a Sections 8.6.2.7 and 8.6.2.8

As shown in **PUBLIC HEALTH Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 1.194 in 1 million at the location of maximum impact, which in this case is located at the western project property boundary. Figure 8.6-2 shows the region in which cancer risk was estimated to be greater than 1 in 1 million, extending slightly beyond the western border of the proposed site (E&LW, 2006a). The maximum cancer risk calculated at the closest residence was 0.032 in 1 million.

Staff reviewed the applicant's modeling and also conducted a quantitative evaluation of the risk assessment results presented in the *Colusa Generating Station Power Plant Project (06-AFC-9)* using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP model). The HARP transaction file and the 2001 meteorological data file for the nearby town of Maxwell were used in this analysis and were provided by the applicant.

Staff's quantitative analysis of facility operations included the following:

- stack parameters, building parameters, emissions, and Universal Transverse Mercator (UTM locations of sources were provided in the HARP transaction file.
- emissions from the two combustion turbine generator stacks, the auxiliary boiler, the emergency diesel fire water pump, and the emergency diesel generator were included in the analysis.
- a coarse receptor grid of -1,500 to 3,000 meters (m) east and -1,500 to 1,500 m north, at 50 m increments.
- exposure pathways assessed include inhalation, dermal absorption, soil ingestion, mother's milk, homegrown produce, pigs, chickens and/or eggs, and drinking water.

For cancer risk calculations using the HARP model, staff used the “Derived (Adjusted) Method” and for chronic noncancer hazard calculations staff used the “Derived (OEHHA) Method.”

A comparison of the results obtained by staff with the results presented in the AFC is presented in **PUBLIC HEALTH Table 4**.

Construction risks were not modeled in the AFC, nor are they addressed in this assessment. The AFC states that “Due to the short-term nature of the construction activities, a HRA (Health Risk Assessment) will not be conducted.” Staff does not object to this approach since previous modeling at numerous past power plant siting cases has shown that the mitigation proposed by the applicant would reduce any risk or hazard to insignificant levels. Since the facility is remote from residences (the nearest residence is more than one mile away), staff believes that the mitigation measures as outlined in Section 8.1.5.10.2.3 of the AFC to minimize diesel particulate exhaust emissions during the two-year construction phase are adequate. Staff incorporated these mitigation measures as conditions of certification in the **Air Quality** section of this staff assessment to ensure compliance.

Cumulative impacts of the proposed project and other projects within a six-mile radius were not quantitatively evaluated in the AFC nor were they addressed in this assessment. The AFC states that the Colusa County Air Pollution Control District indicated that there are no new projects planned within six miles of the site. The only source subject to inclusion in a cumulative analysis is the Pacific Gas & Electric Company (PG&E) Delevan Compressor Station next to the proposed CGS site, which has three gas turbines that were modeled for criteria pollutant emissions in the Air Quality modeling of the AFC.

In conclusion, staff conducted an independent screening assessment of the risks and hazards reported in the AFC using the facility data provided by the applicant. Modeling was conducted using the ARB/OEHHA Hotspots Analysis and Reporting Program. No significant differences in cancer risk, chronic hazard, or acute hazard were found in the staff analysis compared to the results reported by the applicant.

PUBLIC HEALTH Table 4
Operation Hazard/Risk at Point of Maximum Impact:
Applicant and Staff Assessments

	Maximally Impacted Receptor		
	AFC	**Staff**	**Applicable Significance Threshold**
Cancer Risk	1.19E-06	1.17E-06	<= 10E-06 with T-BACT
Chronic (HI)*	0.030	0.013	1.0
Acute HI	0.42	0.40	1.0
	Nearest Resident		
	AFC	**Staff**	**Applicable Significance Threshold**
Cancer Risk	0.032E-06	0.026E-06	<= 10E-06 with T-BACT
Chronic HI	0.00074	0.00023	1.0
Acute HI	0.039	0.029	1.0

*Hazard Isopleth

Staff's analysis, while slightly different from the applicant's, shows that the CGS emissions would not present significant cancer risk or noncancer hazards to any member of the public, including low income and minority populations.

CUMULATIVE IMPACTS AND MITIGATION

The maximum cancer risk for emissions from CGS (calculated by staff) is 1.17 in 1 million located at the facility western fence line. The maximum impact location occurs where pollutant concentrations from CGS would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower since worst-case estimates are based on conservative assumptions and thus overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by the CGS to be either individually or cumulatively significant.

Staff's calculated worst-case long-term noncancer health impact from CGS (0.013 hazard index) is well below the significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any cumulative health impacts to be the result of emissions from the proposed power plant. As with cancer risk, long-term hazard would be lower at all other locations.

The only existing facility in the vicinity of the proposed CGS project that may contribute to a cumulative public health impact is the PG&E Delevan Compressor Station, adjacent to the project site, which has three gas turbines. The applicant conducted a Cumulative Impact Analysis (CIA) for criteria pollutants emitted by this facility and the proposed CGS, which is presented in Section 8.1 of the AFC (E&LW, 2006a). The applicant stated that a CIA for toxic air contaminants is not necessary since the CIA conducted for the Air Quality section of the AFC found cumulative impacts for criteria pollutants to be insignificant, and the contribution of noncriteria pollutant toxic air contaminants to health

risk is negligible compared to criteria pollutants (E&LW, 2006a Section 8.6.3). The applicant stated that with the exception of one proposal for an 18-unit subdivision development, there are no known developments planned in the vicinity of the CGS site.

Staff does not agree with the applicant's contention that no significant cumulative impact due to toxic air contaminants would exist when no significant cumulative impact from criteria air pollutants exists. Staff can find no basis for this statement. However, staff does believe that the CGS will not cause a significant cumulative public health impact even when added to the impact from the compressor station because: 1) the maximum individual cancer risk at the point of maximum impact (PMI) is very low -1.2 in 1 million - which is far less than the level of significance 10 in 1 million; 2) this risk is found at the western fence line, not near the compressor station; 3) the risk at any other location would be lower than that at the PMI; and 4) even if the compressor station risk was significant, the CGS contribution to a cumulative risk would be less than 10 percent of the total, thus rending the contribution insignificant. (Staff has used the 10 percent contribution as a criterion in cumulative impacts assessments for other power plant siting cases.)

COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts. Therefore, there are no environmental justice issues associated with **PUBLIC HEALTH**.

Staff concludes that construction and operation of the CGS will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH**.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the CGS and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public, including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed CGS uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the CGS would not contribute significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

None.

REFERENCES

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L&W (Latham & Watkins). 2007b. L&W/P. Kihm (tn: 39247). Applicant's Response to Data Request 1 through 116. Submitted to CEC/ Docket Unit on 2/13/2007.

OEHHA (Office of Environmental Health Hazard Assessment). 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines*. The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August.

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SOCIOECONOMICS

Amanda Stennick

SUMMARY OF CONCLUSIONS

The Colusa Generating Station (CGS) would require a construction period of twenty-four months to complete. The applicant would use local and regional labor. The CGS would not create any significant negative socioeconomic impacts on the area's schools, housing, law enforcement, emergency services, hospitals, or parks and recreation. Public benefits from the construction of the project include capital cost expenditures, construction payroll, and the value of locally and regionally purchased materials and supplies.

INTRODUCTION

This staff socioeconomics impact analysis evaluates the project's induced changes on community services and/or infrastructure, and related community issues such as environmental justice. Staff discusses the estimated impacts of the construction and operation of the CGS on local communities, community resources, and public services.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOCIOECONOMICS Table 1

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.

SETTING

The project site is located approximately 1.5 miles south of the Colusa–Glenn County border, in Colusa County. Colusa County is bordered on the south by Yolo County, on the west by Lake County, on the north by Glenn County, and on the east by Butte and Sutter Counties. Two small farming settlements surround the project site: Delevan, four miles east of the project site and Sites, located five miles southwest of the project site (CGS 2007). The closest retail services (grocery store, gas stations and restaurants) are in the unincorporated town of Maxwell, located about 6 miles southeast of the site

along Interstate 5 and the incorporated City of Williams, located about 14 miles southeast of the site along the intersection of Interstate 5 and State Route 20 (CGS 2007). The City of Colusa, the County Seat of Colusa County, is about 18 miles from the project site. The City of Chico in Butte County is about 44 miles from the project site and the City of Sacramento in Sacramento County is about 72 miles from the project site.

Land within three miles of the site is used for farming rice, wheat, row crops, or for grazing. Colusa County's economy is based primarily on agricultural activities. As stated in the CGS Application for Certification (AFC), Colusa County is a leading rice-producing county as well as a leader in advanced rice growing technological development. In 2006, 136,400 acres were devoted to rice cultivation (CGS 2007).

For a full description of the socioeconomic setting, please refer to Section 8.8 of the CGS AFC. The study area defined by the applicant in the socioeconomics section of the AFC and also defined by staff is the Colusa-Glenn area, the Yuba Metropolitan Statistical Area (YMSA), and the Sacramento Consolidated Metropolitan Statistical Area (SCMSA). Because of the rural location of the project site, staff used the YMSA and the SCMSA as the study area to determine the availability of a construction workforce. Staff used Colusa County to identify community services, and infrastructure impacts from the CGS, and the Colusa-Glenn area, the YMSA, and the SCMSA to determine fiscal and non-fiscal (private sector) benefits.

DEMOGRAPHIC SCREENING

The purpose of demographic screening is to determine whether a below poverty level or minority population exists within the potentially affected area of the proposed site. Staff conducts the screening in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in [the Environmental Protection Agencies'] EPA's [National Environmental Policy Act] NEPA Compliance Analysis," Guidance Document (EPA 1998). Minority populations, as defined by this Guidance Document, are identified where either:

- the minority population of the local area is greater than fifty percent of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis; or
- one or more census blocks in the local area have a minority population greater than fifty percent.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).
Staff has reviewed Census 2000 information by census block for minority populations within a one-mile and six-mile radius of the site. **SOCIOECONOMICS Figure 1** shows

that the minority populations are 31.25 percent and 14.51 percent, respectively. The threshold for socioeconomic impacts to a minority population is below the level of significance of fifty percent. Therefore, the proposed CGS project will not create a socioeconomic impact.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The criteria used in determining whether project-related socioeconomic impacts would be significant are presented in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Impacts attributable to the project are considered significant if they would:

- Induce substantial growth or concentration of population;
- Induce substantial increases in demand for public services; or
- Displace a large number of people.

Staff reviewed the CGS socioeconomic section in the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations and its own independent analysis. For environmental justice, staff uses a threshold of greater than 50 percent for minority populations as a subset of the total population in the local area. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **RELIABILITY**, **WORKER SAFETY**, 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 or input from local and state agencies. Typically, substantial long-term employment of people from regions outside the study area would have the potential to result in significant adverse socioeconomic impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Population and Employment

Staff considers the study area to include the Colusa-Glenn area, the YMSA, and the SCMSA for purposes of determining the availability of the project construction workforce. The YMSA is located east and northeast of Colusa County and includes the counties of Sutter and Yuba and the incorporated cities of Live Oak and Yuba City in Sutter County, and Marysville and Wheatland in Yuba County. According to the Employment Development Division (EDD), the 2005 construction labor force in the YMSA was 2,500 and is expected to grow at an average annual rate of more than one percent between 2001 and 2008.

The SCMSA includes El Dorado, Placer, Sacramento, and Yolo Counties, and the major cities of Auburn (El Dorado County), Placerville (Placer County), Sacramento (Sacramento County) and Woodland (Yolo County). According to EDD, in 2005, the industries in the SCMSA with the highest employment were government (25.3 percent)

and trade, transportation, and utilities (16.8 percent). From data reported by EDD and shown in the AFC, construction employment in the Colusa-Glenn area, the YMSA, and the SCMSA totaled more than 75,000 workers in 2005.

The applicant states that a sufficient labor supply should be available from the Colusa-Glenn area, the YMSA, and the SCMSA (CGS 2007). Staff agrees that there is more than adequate construction labor by skill within this regional area. The following **SOCIOECONOMICS Table 2** shows that total labor by skill in the YMSA and the SCMSA is considerable when compared to the construction needs of the CGS.

SOCIOECONOMICS Table 2
Total Labor by Skill in the YMSA and SCSMA

Trade	YMSA/SCMSA	Workers Needed
Boilermaker[1]	788	62
Carpenter	33,560	68
Electrician	7,130	165
Laborer	2,220	68
Pipefitter	6,370	162
Painter/Insulator	5,700	14
Bricklayer/Mason	610	36
Operating Engineers	3,150	55
Millwrights	310	97
Ironworkers	220	44

Source: EDD Labor Market Information; Occupational Employment Projections 2006.
1. The "Boilermakers" category reflects the entry for all "Extractive and Related Workers," of which boilermakers are a part. These numbers overstate the actual number of boilermakers, but were the only number available, as the "Boilermaker" category itself was not broken out in any of the geographic areas labor force projections data sets.

The CGS construction period is twenty-four months with an estimated start time of spring of 2008 and an online date of spring 2010. As shown in Table 8.8-9 of the AFC, the number of construction workers (total onsite site staff) would range from 36 in the first month of construction to 32 workers in the twenty-fourth month of construction. The average number of workers onsite during the twenty-four month construction period would be 298. During the peak period of construction (months 13 through16), an average of 646 construction workers would be onsite.

Secondary Economic Project Impacts

The Impact Analysis for Planning (IMPLAN) model (Professional Version 2.0, copyright Minnesota IMPLAN Group, 1997) used in the CGS AFC to estimate employment impacts from the project on the affected area is widely used and therefore acceptable to staff. The applicant estimated the indirect and induced impacts using multipliers that were derived from IMPLAN economic modeling software and data specific to the study area (CGS 2007)[1].

[1] Indirect impacts are the changes in sales, income, or employment within the study area and region for companies supplying goods and services during construction and operation; induced impacts are changes in spending resulting from direct and indirect changes in the economy.

As stated in the AFC, construction activity would result in very little secondary economic impacts (indirect and induced) within the Colusa–Glenn area, the YMSA, and the SCMSA. While the applicant estimates that indirect and induced effects of construction would include an additional 174 to 228 jobs, $78 to $86 million in labor income, and approximately $417 million to $464 million in output (the total value of goods and services), very few of these secondary impacts would occur within the study area because most of the purchases would be made outside the region (Dorje 2007).

Similar to construction, operation of the proposed project would result in very little indirect and induced economic impacts within the Colusa–Glenn area, the YMSA, and the SCMSA. The applicant estimates that direct and induced employment effects of annual operation that would occur within Colusa–Glenn would be an additional eight to eleven permanent jobs. In the YMSA and SCMSA, indirect and induced employment impacts in addition to those that would occur in Colusa–Glenn would be an additional 65 permanent jobs, for a total of 73-76 permanent jobs.

Staff considers these projected beneficial economic impacts to be reasonable and finds the economic analysis acceptable and consistent with those of past siting projects. **SOCIOECONOMICS Table 4** provides a summary of socioeconomic data and information from this analysis.

Housing

The applicant estimates that 40 percent of the construction workforce would commute weekly to the site and would stay in temporary housing, such as motel or hotel rooms Monday through Friday returning home on the weekends, or they would bring their own recreational vehicles and stay in a recreational vehicle park. As stated earlier, the average number of workers on site during the twenty-four month construction period would be 298, which would mean about 107 construction workers on average, would need temporary housing near the site. During the peak construction period (months 13 through16), the number of weekly commuters would be about 239.

As stated in the AFC, about 2,333 hotel rooms or recreational vehicle spaces are located within a one hour commute of the proposed site. Colusa County has about 550 hotel or motel rooms, with the majority of hotels located in the City of Williams (Applicant's Response to Data Request 1 through 116). The average hotel occupancy in Colusa County is 75 percent. Therefore, about 137 rooms would be available in Colusa County alone. In Glenn County, the City of Willows has about 265 hotel rooms available (Applicant's Response to Data Request 1 through 116). Average occupancy rate for the City of Willows is 65 percent, which includes the migrant farm workers who stay in the area during planting and harvesting season. Applying the 65 percent occupancy rate to the 265 rooms, approximately 92 rooms would be available in the City of Willows. Chico in Butte County has 1,225 hotel rooms with vacancy rates ranging between 60 and 90 percent.

A large variety of recreational vehicle (RV) parks are located within a 45-minute commute from the project site; most are located in the Cities of Colusa, Williams, Marysville, Dunnigan, and Arbuckle. There is also one RV park in Chico with 44 spaces. According to the applicant, all of the RV parks have varying seasonal vacancy. Several RV Parks indicated that spaces could be reserved far in advance to guarantee

availability. On average, the busiest times are the winter and summer months; during this time vacancy rates range from 5 to 20 percent. The winter season is typically busy due to the holiday traveling season and summer is busy due to farming season and recreational travelers. The spring and fall months have average vacancy rates ranging from 25 to 50 percent. None of the RV parks have restrictions on the length of stay (Applicant's Response to Data Request 1 through 116).

As indicated on Table 8.8-10 in the AFC, the maximum period of employment for at least some of certain types of craft workers could exceed one year, making rental of apartments or homes another viable workforce housing option. **SOCIOECONOMICS Table 3** shows the availability of local and regional housing and vacancy rates in the project area.

SOCIOECONOMICS Table 3
Local and Regional Housing Assessment for the CGS

Local and Regional Housing					
Location	**Total Units**	**Single-Family**	**Multi-Family**	**Mobile Homes**	**Vacancy Rate (%)**
Colusa County	7,587	5,883	875	829	9.8
Glenn County	10,522	7,513	1,480	1,529	8.1
Butte County	85,253	54,041	17,290	13,761	7.0
Sutter County	32,472	24,889	5,863	1,710	4.5
Yuba County	26,631	18,929	3,859	3,844	10.0
El Dorado County	81,478	67,699	9,404	4,375	16.9
Placer County	140,330	113,098	22,494	4,738	10.9
Sacramento County	535, 788	377,741	142,338	15,709	4.3
Yolo County	70,542	45,538	21,319	3,658	3.5

Source: DOF, 2006 in CGS AFC.

About 40 percent of the construction workforce (on average about 107 workers) would commute on a weekly basis to and from the site. Given the availability of housing, motel and hotel rooms, and RV parks, staff does not expect this project to adversely impact local housing. The temporary influx of construction workers during the week is not expected to place demands on the local lodging industry that cannot be met.

The project would have 31 full-time employees. The applicant estimates (based on modeling assumptions) that most of these employees would reside within 40 miles of the proposed project. Almost half of the employees would likely locate in Chico given its size, amenities, and proximity to the site; the rest would reside elsewhere. Table 8.8-14 in the AFC lists towns within a 60-mile range of the project site where operations employees might choose to live.

Based on the above-listed vacancy rates, staff does not expect the 31 employees would have difficulty finding housing within Colusa–Glenn, the City of Chico, or within reasonable commute distance in the study area. The relocation of 31 full-time employees and their families would not create a substantial increase in population that

would create a substantial increase in the demand for public services. Were all 31 employees to locate within the Colusa–Glenn area, using 2.5 persons per household, an additional 78 people would be added to the population, representing 0.1 percent of the Colusa–Glenn population in 2006.

Staff concludes that the construction and operation workforce would not have a significant adverse impact on housing within the Colusa–Glenn area, the YMSA, or the SCMSA.

Fiscal and Non-Fiscal Impacts

The project is being proposed by E&L Westcoast, LLC (E&L Westcoast) who would construct and commission the power plant. Upon completion of commissioning, E&L Westcoast would transfer ownership and operation of the project to PG&E. Because the power plant would be owned by a public utility, the State Board of Equalization (BOE) would perform an annual valuation on all properties owned or used by the utility in its utility operations (CGS 2007).

The CGS has a projected construction cost of $450 to 500 million. According to the BOE, the project would result in the equivalent of a property valuation in the range of $157 to $200 million. Using the property tax rate of 1 percent, the estimated property tax revenue that would accrue to Colusa County annually from such a plant would be about $1.575 million to $2.0 million (CGS 2007).

This property tax revenue would be distributed among local jurisdictions within Colusa County based on the County Auditor's formula. Senate Bill 1317, signed into law on September 30, 2006, makes changes to how property taxes for new power plants constructed after January 1, 2007, will be allocated to local jurisdictions within a county. The total amount of assessed values allocated to any particular county would not be affected, but more of the revenue will be directed to the area where the actual construction occurs. The share of revenue that would ordinarily flow to other cities within the county (in this case, the City of Colusa and the City of Williams) would be directed to the jurisdiction in which the construction actually occurs (in this case Colusa County, since the Maxwell area is unincorporated). The share of revenues that would flow to other special service districts within the County, such as fire districts or school districts, would not change (CGS 2007).

The applicant anticipates that 90 percent of the non-labor project costs (turbines and other major CGS equipment) would be incurred outside the local or Sacramento areas. The applicant expects all gravel and concrete needs to be available in Colusa and Glenn Counties. The applicant would purchase locally building materials and supplies such as scaffolding, insulation, and paint to the maximum extent practicable. To ensure that local financial benefits are maximized, staff has proposed condition of certification **SOCIO-1** that requires the project owner to procure materials locally, with certain exceptions.

The applicant did not calculate sales tax from construction and operation costs and spending because retail sales in the area (i.e. gas, food, and lodging from construction and operation worker purchases and from supplies purchased locally) would be so

minimal that any revenue accruing from sales tax would be negligible. Most of the construction purchases would be made in the San Francisco Bay Area (Dorje 2007).

In the AFC, the applicant states that about two percent of the non-labor costs of construction would be spent in Colusa and Glenn Counties. The cost of construction of the proposed plant ($450 to $500 million) minus the total payroll for construction ($78.75 to $87.5 million) would be $371.25 to $412.5 million. Thus, staff estimates that two percent of the non-labor costs of construction would total between $7.425 and $8.25 million. Based on the 7.25 percent sales tax in Colusa and Glenn Counties, sales tax revenue attributable to construction materials and equipment is estimated at upward of $598,125 for the two-year construction period.

The non-fiscal impacts of the CGS include:

- Estimated capital costs are $450 to $500 million.
- Estimated construction payroll is $78.75 to $87.5 million over 24 months.
- Estimated operations payroll is $3.15 million annually to the region.

Annual dollar amounts spent locally on operation materials and supplies were not estimated by the applicant. To ensure that local financial benefits are maximized, staff has proposed condition of certification **SOCIO-1** that requires the project owner to procure materials locally, with certain exceptions.

Public Services

Education

The project site is located within the boundaries of the Maxwell Unified School District (MUSD), which includes Maxwell Elementary School (K-8), Maxwell High School, and Enid Prine High School. These schools are closest to the site and are located in the community of Maxwell, about 6 miles southeast of the project site. For the most part, enrollment within these districts has declined (see Table 8.8-7 in the CGS AFC).

SOCIOECONOMICS Table 4
School District Enrollment Within the Study Area 2006-2007

Maxwell Unified	473
Pierce Joint Unified	1,359
Williams Unified	1,225
Chico Unified	13,540
Orland Joint Unified	5,907
Willows Unified	2,313
Hamilton Union Elementary	1,766
Hamilton Union High	473
Princeton Joint Unified	193
Capay Joint Union Elementary	137
Plaza Elementary	136
Lake Elementary	133
Stony Creek Joint Unified	97

Source: DOE Educational Demographics Unit

In addition to the above school districts, the YMSA includes 19 school districts and had 33,696 enrolled students during the 2006-2007 school year. For the same school year, the SCMSA's total enrollment (in 57 districts) was 361,544 students (EDD 2007).

During construction, sixty percent of the labor force would commute daily from the Colusa-Glenn area, the YMSA or the SCMSA, while the other 40 percent would commute weekly. Due to the commuting habits of construction workers and the relatively short construction time, staff does not expect any construction workers to move and/or bring their families to the area during the construction period. Therefore, staff does not expect a significant adverse impact to the areas' schools due to construction of the proposed project.

A total of 31 workers are needed to operate the CGS. Although the applicant is committed to giving local preference when hiring, because of the specialized skills required for plant operation, the applicant expects to hire most of the 31 skilled full-time employees from outside the study area (CGS 2007). As previously stated, the applicant expects most of the operation workforce to relocate within 40 miles of the CGS site with half of the employees likely locating in Chico. Should all 31 operation workers relocate to the Colusa-Glenn area and the City of Chico, an average family size of 2.5 persons per household would result in the addition of about 26 school children to the school districts within these areas. Given the number of possible schools with the Colusa-Glenn and Chico school districts, staff does not expect a significant adverse impact to the areas' schools due to the possible addition of 26 school children.

Education Code section 17620 states that school districts are authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities. School facilities are defined as "any school-related consideration relating to a school district's ability to accommodate enrollment." California Government Code Sections 65996-65997 state that 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. The MUSD charges owners of new commercial industrial development $0.36 per square foot for covered and enclosed space. Based on an estimated 15,340 square feet of covered and enclosed space for the CGS, the MUSD would charge the applicant a one-time school impact fee of approximately $5,522.

Law Enforcement

The Colusa County Sheriff's Department provides public safety and law enforcement services to the unincorporated areas of the County, including the project site. The headquarters are located at 929 Bridge Street in the City of Colusa, about 23 miles southeast of the site. Twenty-nine patrol officers cover an area of more than 1,000 square miles. Staff includes 39 sworn officers and 14 correctional officers. Other law enforcement agencies within Colusa County include the District Ranger for the Mendocino National Forest, and the Fish and Game Warden for the National Wildlife Refuges. The California Highway Patrol (CHP) operates on state roads in the county and maintains an office and vehicle yard in Williams, with 21 uniformed officers. The CHP provides traffic enforcement and accident investigations throughout the county (CGS 2007).

Because of the onsite security during construction and operation and other safety procedures described in the Worker Safety and Health section of the AFC and because the operation of power plants require little in the way of law enforcement, staff concludes that the existing law enforcement resources would be adequate to provide services to the CGS during construction and operation.

Medical Services

The emergency services station closest to the project site is the Maxwell Fire Protection Districts (MFPD) rural station, located at 231 West Oak in Maxwell, about 7.5 miles southwest of the site. The station is one of nine rural fire districts and two municipal fire departments that serve Colusa County. MFPD rural station is responsible for structural and wildfire protection and medical emergencies within its boundaries. Other stations close to the site include the Princeton Rural Station, approximately 10 miles to the east, the rural fire districts of Williams and Colusa, approximately 10 miles to the south, and the municipal districts of Williams and Colusa, approximately 10 miles to the southeast, respectively. All stations within Colusa County have mutual aid agreements with each other (CGS 2007).

Ambulance and emergency medical services (including helicopter service) are provided to Colusa County by Enloe Ambulance, a private contractor. The closest Enloe ambulance crew is located in Williams; another crew is located in Colusa. Enloe helicopter service would originate in Chico (CGS 2007).

Facilities that provide medical services to the project site include Glenn General Hospital, Valley West Care Center, and Colusa Community Hospital. Glenn General Hospital is the closest to the site, located at 1133 West Sycamore Street in Willows, approximately 17 miles from the site. Valley West Care Center and Colusa Community Hospital are located 19 and 24 miles from the site, in Williams and Colusa, respectively. Colusa Community Hospital has 48 beds, 24-hour physician-staffed emergency care, maternity, home health, industrial medicine, and preventive medicine services (CGS 2007).

Because of the onsite security during construction and operation and other safety procedures described in the Worker Safety and Health section of the AFC, staff concludes that the emergency medical services resources would be adequate to meet the needs of the CGS during construction and operation.

Parks and Recreation

The City of Colusa Parks Division is responsible for operating nine of the city's parks. Eight of these parks feature picnic tables, barbeque units, restrooms, and playground areas; one park has two softball fields. Larger parks within the region include the Colusa-Sacramento River State Recreation Area and the Lake Oroville State Recreation Park. Both parks feature camping, picnicking, boating, swimming, and fishing.

The City of Chico Parks Division is responsible for operating Community Park Recreation Area and Hooker Oak Recreation Area within Chico. These two facilities

include softball fields, soccer fields, tennis courts, a sand volleyball court, barbeque units, horseshoe pits, play equipment, and a picnic area with tables.

Bidwell Park, also in the City of Chico, contains 3,670 acres and is one of the largest municipal parks in the United States. Bidwell Park offers hiking swimming, biking, horseback riding and picnicking.

Staff concludes that there are a number and variety of parks within the regional project area and does not expect the construction or operation workforces to have a significant adverse impact on parks and recreation. In addition, construction workers are unlikely to bring their families to a work site and therefore impact existing park services.

CUMULATIVE IMPACT

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. (Cal.Code Regs., tit. 14, section 15130.)

Cumulative impacts may occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by local labor, resulting in an influx of non-local workers and their dependents.

The Colusa County Planning Department has given tentative approval for the construction of an 18-unit subdivision near Maxwell. However, construction has been delayed due to water issues. In addition to the tentatively approved residential development, an ethanol plant is proposed near Interstate-5 south of Maxwell and north of Williams. The county expects to conclude its environmental analysis of the project by this fall. According to Steve Hackney, Planning Director for Colusa County, most of the proposed development has been in the south part of the county (Hackney 2007).

While increased demand for lodging services could occur in the area during construction of any future development projects, a sufficient number of rooms exist within commuting distance to accommodate the proposed project and the 18-unit subdivision, were it to be constructed during the CGS construction period (spring 2008 through spring 2010). In addition, there would be a sufficient number of skilled construction workers to accommodate the CGS and any potential development project because the affected trades for the YMSA and SCMSA number 60,058 (EDD).

Based on this information staff agrees with the applicant that potential cumulative impacts to socioeconomics would be less than significant.

NOTEWORTHY PUBLIC BENEFITS

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

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or members of the public regarding **SOCIOECONOMIC RESOURCES** for the CGS.

CONCLUSIONS

Estimated gross public benefits from the CGS include increases in sales tax, employment, and income for the Colusa-Glenn area, the YMSA, the SCMSA, and the State of California. **SOCIOECONOMICS Table 5** provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the CGS.

Staff concludes that construction and operation of the CGS would not cause significant direct or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency services, parks, and hospitals. Staff also concludes that the CGS would not induce substantial growth or concentration of population; induce substantial increases in demand for public services; or displace a large number of people.

SOCIOECONOMICS Table 5
Data and Information

Total Project Capital Costs	$450-500 million
Estimate of Regionally Purchased Equipment and Materials	
Construction	$371.25-$412.5 million
Operation	$50,000 annually (Colusa and Glenn Counties)
Estimated Annual Property Taxes	$1.575-$2.0 million
Estimated School Impact Fees	$5,522 one-time fee to MUSD
Direct Employment	
Construction (average)	298 jobs
Operation	31 permanent employees
Secondary Employment	
Construction	174-228 jobs (Colusa-Glenn, YMSA, SCMSA, State of California)
Operation	73-76 jobs (Colusa-Glenn, YMSA, SCMSA)
Direct Income	
Construction	Not estimated
Operation	Not estimated
Secondary Income	
Construction	$78-$86 million in labor income (Colusa-Glenn, YMSA, SCMSA, and California) $417-$464 million in output (non labor costs plus value added) in Colusa-Glenn, YMSA, SCMSA, and California
Operation	Not estimated
Payroll	
Construction	$78.75-$87.5 million for 24 months (2006 dollars)
Operation	$3.15 million annually (2011 dollars)
Estimated Sales Tax	
Construction	$598,125 (2006 dollars)
Operation	Not estimated
Average Annual Unemployment Rates (2005)	Colusa County – 12% YMSA – 11% SCMSA – 5%
Percent Minority Population (6 mile radius)	14.51 percent based on the 2000 Census.
Percent Poverty Population (6 mile radius)	18.29 percent based on the 2000 Census.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner and its contractors and subcontractors shall procure materials and supplies within Colusa and Glenn Counties unless the materials or supplies are not available.

Verification: At least 60 days prior to the start of construction, the project owner shall submit to the Energy Commission Compliance Project Manager (CPM) copies of vendor solicitations and guidelines stating procurement requirements and procedures. In addition, the project owner shall notify the CPM in each Monthly Compliance Report of the reasons for any planned procurement of materials outside Glenn and Colusa Counties that will occur during the next two months.

SOCIO-2 The project owner shall pay the one-time statutory school facility development fee to the Maxwell Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the CPM proof of payment of the statutory development fee.

REFERENCES

California Energy Commission Statewide Transmission & Power Plant Maps 2006, Census Pl 94-171 Data-Matrix PL2.

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City of Chico Parks and Recreation Department http://www.chico.ca.us/parks/Home_Page.asp

City of Colusa Parks and Recreation Department http://www.colusa-ca.gov/parkrec/parkrec_home.htm

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Hackney, Steve. Planning Director Colusa County Planning. Personal communication with Amanda Stennick on June 1, 2007.

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Reliant (Reliant Energy Colusa County, LLC). Reliant Application for Certification, Colusa Power Plant Project (01-AFC-10), docketed July 6, 2001.

State of California, Employment Development Department (EDD) 2006. Labor Market Information, Occupational Employment Projections 2004-2014 Sacramento and Yuba Metropolitan Statistical Areas.

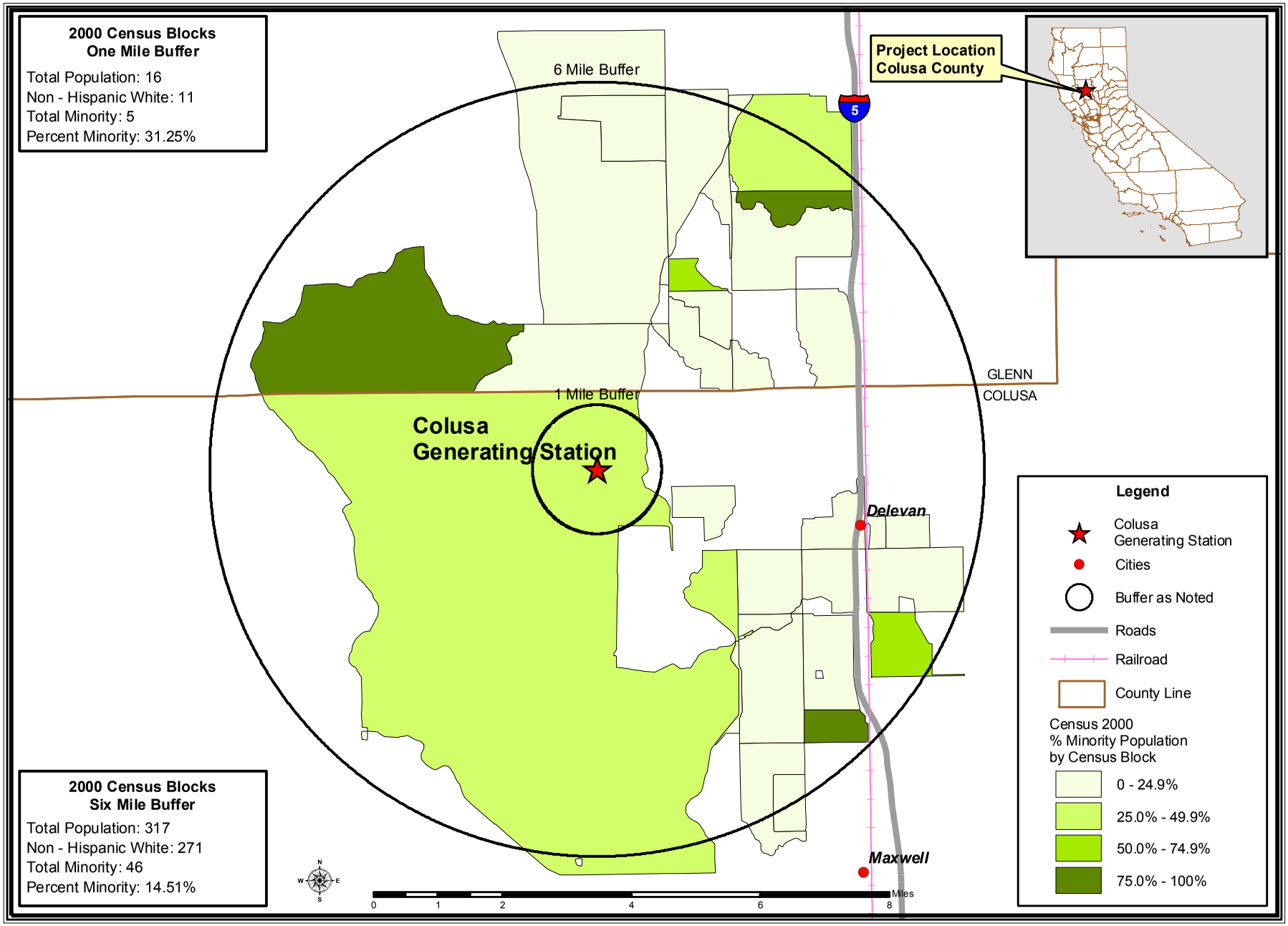
U. S. Environmental Protection Agency (EPA), Office of Federal Activities. 1998. Final Guidelines for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance.

U. S. Office of Management and Budget (OMB). 1978. Current Population Reports, Series P-60 on Income and Poverty.

SOCIOECONOMICS - FIGURE 1

Colusa Generating Station - Census 2000 Minority Population by Census Block - One and Six Mile Buffer

JULY 2007



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, NOVEMBER 2006

SOURCE: California Energy Commission Statewide Power Plant Maps 2006 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Richard Latteri

SUMMARY OF CONCLUSIONS

Staff has not identified any unmitigable significant impacts to soil and water resources provided the proposed conditions of certification are implemented. The following are staff's findings based on its preliminary assessment of the proposed Colusa Generating Station:

- potential adverse impacts caused by soil erosion and stormwater flows during construction and operation would be mitigated with the development and implementation of effective stormwater pollution prevention plans and a drainage, erosion, and sediment control plan;
- potential degradation to surface-water or groundwater quality would be mitigated through the development and implementation of an effective zero liquid discharge management plan and through the permitting requirements of Colusa County's sewage disposal ordinance; and
- final execution of the three-party agreement between E&L Westcoast, LLC, Glenn-Colusa Irrigation District, and the County of Colusa would provide a reliable long-term water supply for the Colusa Generating Station that is consistent with state laws and water-use policies. Staff will need this agreement for completion of the Final Staff Assessment.

INTRODUCTION

This section of the Preliminary Staff Assessment (PSA) analyzes the potential effects on soil and water resources of the proposed Colusa Generating Station (CGS) project. This analysis specifically focuses on the potential for the CGS to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood condition 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).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOIL AND WATER Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Federal LORS	
Clean Water Act (33 USC, §§ 1251 et seq.)	The Clean Water Act requires states to set standards to protect water quality, which includes regulation of stormwater discharges during construction and operation of power plant facilities.
Section 401 permit	Section 401 of the Clean Water Act requires that any activity that may result in a discharge into a water body must be certified by the Regional Water Quality Control Board.
Section 404 permit	Section 404 of the Clean Water Act authorizes the US Army Corps of Engineers to regulate the discharge of dredged or fill material to the waters of the US.
Resource Conservation and Recovery Act (40 CFR, part 260 et seq.)	The Resource Conservation Recovery Act of 1976 seeks to prevent surface-water and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
State LORS	
California Water Code, section 13260	Requires filing with the appropriate Regional Water Quality Control Board (RWQCB) a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.
California Water Code, section 13551	Requires the water resources of the state be put to beneficial use to the fullest extent of which they are capable, and the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.
Local LORS	
Colusa County sewage disposal system permit	Colusa County Environmental Health Division's requirements for site evaluation and application for a sewage disposal system permit.
State Policies and Guidance	
California Constitution, Article X, section 2	This section 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.
The Porter-Cologne Water Quality Control Act of 1967, California Water Code, section 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water-quality criteria to protect state waters. Those regulations require that the RWQCBs issue waste discharge requirements specifying conditions for protection of water quality as applicable.
SWRCB Resolution 75-58	The SWRCB has adopted policies that provide guidelines for water quality protection. The principal policy of the SWRCB that specifically addresses the siting of energy facilities is *Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling* (adopted by the board on June 19, 1975, as Resolution 75-58).
SWRCB Water Quality Order 92-08	Requires the SWRCB to regulate industrial stormwater discharge from construction projects affecting areas larger than one acre to protect state waters.
California Code of	Title 23, Division 3, Chapter 15, requires the RWQCB to issue waste

Regulations, Title 23	discharge requirements specifying conditions for protection of water quality as applicable.
California Water Code, section 13146	Requires that state offices, departments, and boards, in carrying out activities that affect water quality, shall comply with state policy for water-quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the SWRCB in writing their authority for not complying with such policy.
California Safe Drinking Water and Toxic Enforcement Act	This act (California Health and Safety Code, section 25249.5 et seq.) prohibits actions that contaminate drinking water with chemicals known to cause cancer or possessing reproductive toxicity.
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

E&L Westcoast, LLC (applicant) proposes to construct a nominal 660-megawatt combined-cycle power plant in Colusa County. The site would be located on the western edge of the Sacramento Valley, a broad structural basin bounded to the west by the Coast Range and to the east by the foothills of the Sierra Nevada. The Sacramento Valley is underlain by sediments that have been transported from the surrounding mountains by the Sacramento River and its tributaries.

Surface-water runoff from the site and surrounding area is conveyed via both man-made canals and natural streams to the Sacramento River. The site is within the Sacramento Valley Groundwater Basin, with groundwater flowing from the north in a southeast direction to the Sacramento River (E&L 2006a, section 8.14.1.1 and Appendix N).

REGIONAL DESCRIPTION

The project would be located in northern Colusa County in a region that includes both the eastern edge of the northern Coast Range and the western portion of the Sacramento Valley. The site slopes gently to the east, is currently used as open range for cattle grazing, and lies within the Hunters Creek watershed. The Tehama-Colusa Canal (TCC) is located approximately 0.5 mile west of the site and the Glenn-Colusa Canal (GCC) is about 0.75 mile east of the site. A cross-tie canal linking the GCC to the TCC is north of the site at a distance of approximately 0.8 mile. (E&L 2006a, section 8.15.1; URS 2007g, data response 22, section 2).

PROJECT, SITE, AND VICINITY DESCRIPTION

The applicant proposes to construct the CGS on 31 acres of a 100-acre site near an existing Pacific Gas & Electric Company's (PG&E) gas compressor station. Adjacent and surrounding properties include undeveloped lands used for grazing to the north, south, and west, and PG&E's natural gas compressor station to the east (URS 2007g, data response 22, section 1).

The project would include a power-generation facility, switchyard, construction laydown area, and stormwater detention basins. The 100-acre site is located approximately 14 miles northwest of the community of Williams and 4 miles west of Interstate 5. The site would be accessed by Dirks Road, which currently provides access to PG&E's gas compressor (URS 2007g, data response 22, section 1).

Linear facilities include four double-circuit 230-kV transmission lines connected to the power plant's new substation and PG&E's existing transmission lines located approximately 1,800 feet to the west; 1,500 feet of 8-inch natural gas pipeline; a new 2,700-foot water-supply pipeline to the TCC; and a 2,500-foot access road extending from the existing road currently used to access PG&E's compressor station (E&L 2006a, section 1.4).

To allow for transportation of some of the heavier components to the site, the bridge on Dirks Road over the Glenn-Colusa Canal and the bridge on McDermott Road over Teresa Creek would be replaced. The eastern side of the Delevan/ McDermott intersection would be widened. A more complete description of the project that includes site layout and regional maps is contained in **PROJECT DESCRIPTION** (E&L 2006a, section 1.4)

SOILS

Soil types in the vicinity of the proposed CGS site are divided into two strata: surficial clay and silty deposit. The surficial clay consists of medium stiff to very stiff dark brown clay to sandy clay with trace amounts of roots. The silty deposit consists of very stiff to hard silts to sandy silts. The surficial clays just beneath the surface of the undisturbed site extended to a depth of approximately 16 feet and are poorly drained (E&L 2006a, section 8.9.1.3 and Appendix Q).

Seven soil types have been identified that would potentially be affected by the construction of the CGS and its linear facilities. Table 8.9-1 in the application for certification (06-AFC-9) summarizes the physical and chemical characteristics of those soil types and provides the erosion-hazard index and revegetation potential.

GROUNDWATER

The proposed CGS site is located within the Colusa Subbasin of the Sacramento Valley Groundwater Basin. The Colusa Subbasin is bounded on the east by the Sacramento River, on the west by the Coast Range and foothills, on the south by Cache Creek, and on the north by Stony Creek. The subbasin aquifer system is composed of continental shelf deposits of the late Tertiary to Quaternary age. The water-bearing formations are primarily within the Tertiary deposits consisting of the Tehama Formation and the Tuscan Formation (DWR 2006).

A groundwater investigation was conducted in 2001. Three exploratory wells were drilled in the vicinity of the project site to a depth of approximately 300 feet below ground surface. Depth to groundwater was observed at approximately 45 feet below ground surface. Groundwater in the vicinity of the site has not been greatly developed for consumptive uses due to the availability of surface water and the low potential for

groundwater production. Elsewhere in the county, groundwater is used as a source of drinking water (E&L 2006a, sections 8.14.1.1 and 1.2)

SURFACE WATER

The proposed CGS site is located within the Sacramento River Basin. The Sacramento River is the largest river in California, with its headwaters originating southwest of Mount Shasta and flowing south to the San Francisco Bay. Surface-water runoff from the Coast Range and surrounding area is conveyed via both man-made canals and natural streams to the Sacramento River.

The Tehama-Colusa and Glenn-Colusa canal systems are located in the vicinity of the proposed site. The Tehama-Colusa Canal Authority (TCC Authority) operates and maintains the TCC, which is owned by the US Bureau of Reclamation (USBR). Water for the TCC comes from the Sacramento River at the Red Bluff Diversion Dam. Water delivered through the TCC serves 14 water districts including Colusa County lands west of Maxwell, Williams, and Arbuckle.

The Glenn-Colusa Irrigation District (GCID) owns and operates the 65-mile-long GCC and provides water to various users. Water for the GCC comes primarily from the Sacramento River at Hamilton City and is supplemented from Stony Creek in Glenn County and with groundwater. GCID has senior water rights (pre-1914) to the USBR's Central Valley Project (E&L 2006a, section 8.14.1.2).

Project Water Source

The applicant proposes to provide water to the CGS from the TCC located west of the project site. Raw water from the TCC would be used for all potable and nonpotable purposes. The applicant proposes to install a water intake and a 2,700-foot-long water-supply pipeline from the TCC to the CGS (E&L 2006a, sections 1.1, 3.4.6.1, and .6.2).

By letter dated October 16, 2006, GCID has expressed its willingness to provide water service to the CGS project. In its "Will Serve" letter, GCID conditions the delivery of raw water to the CGS on the following:

A. approval of the water transfer by the USBR and/or Colusa County, and/or Glenn County, if necessary;

B. approval of the CGS by the California Energy Commission;

C. approval of the CGS by the Colusa and/or Glenn County Boards of Supervisors, if necessary;

D. completion of appropriate California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA) documentation by the appropriate lead agencies, if necessary;

E. completion of any required consultations under the state and federal Endangered Species Acts;

F. agreement by GCID and E&L Westcoast to mutually acceptable terms for ensuring delivery of the water supply to the project.

Based on the applicant's status report #2 dated May 30, 2007, the applicant and GCID have agreed on the terms of the water agreement. GCID would deliver 130 acre-feet of surface water annually to the CGS from the TCC. GCID and the applicant are currently awaiting comments from Colusa County prior to finalizing the agreement and submitting it to the USBR. Under the terms of the GCID's contract with the USBR, the USBR has up to 90 days to review and approve the agreement. The USBR's approval process cannot begin until the final water agreement has been signed by all parties (URS 2007g, data response 19).

PROCESS AND SANITARY WASTEWATER

The applicant proposes two separate wastewater-collection systems for the CGS. The first is the plant wastewater system, which collects all wastewater generated from operation of the plant and delivers it to the zero liquid discharge (ZLD) system. All industrial wastewater streams are recycled through the water purification system and returned to the demineralizer as a makeup supply. The remaining sludge is concentrated in a dryer, which reduces the sludge to solids for disposal in a landfill. No wastewater would be discharged to surface waters (E&L 2006a, section 8.13.2.1.2).

The second wastewater-collection system proposed by the applicant is the sanitary system. The sanitary system would collect wastewater from sinks, toilets, and other sanitary facilities for discharge to an on-site septic system (E&L 2006a, section 3.5.6).

STORMWATER

The CGS site is located approximately half-way between the Tehama-Colusa and Glenn-Colusa canals. Drainage is generally from west to east, perpendicular to the alignment of the canals. Stormwater runoff flows towards the site from the west as concentrated shallow flow. This concentrated flow would be intercepted by diversion ditches and directed around the site during plant construction and operation.

For the developed site, runoff collected on built-up areas would be detained in stormwater detention basins with discharge volume maintained at equal to or less than predevelopment peak levels as determined by standard hydrologic methods. The applicant proposes to discharge all stormwater onto rip-rap aprons or level spreaders designed to avoid erosion and reduce the velocity of the flow before reaching the natural preexisting swales (URS 2007g, data response 22, section 3.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The CGS project was analyzed to determine whether it complies with LORS and meets the standards found in relevant documents such as the CEQA Guidelines. The threshold of significance is based on the ability of the project to be built and operated without violating standards for erosion, sedimentation, flood control, surface-water or groundwater quality, water use (supply), and wastewater discharge.

The federal, state, and local LORS presented in **SOIL AND WATER Table 1** were used to determine the threshold of significance and project consistency with state water

policy. For those impacts that exceed the published standards or do not conform to the established practices, mitigation has been proposed by staff to reduce or eliminate the impact.

Responsible or lead agencies for CEQA and/or NEPA, or those with an advisory or trustee capacity, particularly those with discretionary approval over various aspects of the project, will be consulted as required. For example, the local Regional Water Quality Control Board has expertise and LORS responsibility for soil and water issues under its jurisdiction. Where it is necessary for the project to conform to legally enforceable LORS or other regulatory requirements in which the purpose is to define an allowable level of impact or activity, such requirements may be used if they are determined by staff to be adequate as thresholds of significance.

The application of best management practices (BMPs) will be required to manage stormwater-related drainage, erosion, and sedimentation issues during construction and operation of the CGS. The need to develop, implement, monitor, maintain, and update construction and operation plans will be considered in a manner similar to a threshold of significance because without effective BMPs, significant impacts would likely occur. Staff has recommended conditions of certification specifically prescribing BMPs and procedures where necessary.

The methods used to analyze impacts and determine thresholds of significance for any impact are, in many cases, particular to the situation and reflect a site-specific approach for each project component and each impact. The construction and operation of power plants will create impacts. Staff's goal is to limit impacts to an insignificant or acceptable level, or to avoid the impact if possible. Such a determination by staff will rely on science, technology, expert opinion, and best professional judgment to determine what the level of change to baseline or preexisting conditions should be.

Scientific, technical, and other applicable literature was considered in the analysis and determination of significant impacts. Project-specific studies or assessments were reviewed to establish thresholds, adequately estimate the project's impacts, and develop appropriate mitigation. Staff's analysis relies on estimates and information provided by the applicant. The determination of potential impacts and recommended mitigation are the direct result of CGS-related information and estimates.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Erosion Control and Stormwater Management

Construction and operation impacts for erosion and stormwater must be addressed to avoid potential adverse impacts to water quality and soil resources. Accelerated wind- and water-induced erosion may result from earth-moving activities associated with construction of the project. Alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Soil erosion causes the loss of topsoil and can increase the sediment load in surface waters downstream of the construction site. Increasing the amount of impervious surface area increases the amount of runoff and peak stormwater discharges from a developed site.

The CGS site and vicinity are currently unoccupied agricultural land used for grazing. The project would include a power-generating facility, switchyard, and associated linear facilities. When completed, these facilities would occupy approximately 31 acres within the 100-acre fenced-in site. During construction, approximately 89 acres would be temporarily disturbed including 53 acres for temporary offices, construction parking, and a laydown area. In addition to the 89-acre construction site, the project would include construction of a new bridge across the Glenn-Colusa Canal (GCC), a new bridge across Teresa Creek, and improvements to the intersection of Delevan Road and McDermott Road (URS 2007g, data response 22, section 1.4).

During construction, the applicant proposes BMPs such as silt fences, straw bales, and covered stockpiles to minimize the potential for erosion and discharge of pollutants off site. Stormwater runoff from the plant and laydown areas (approximately 63 acres) would be conveyed to an unlined, 2.2-acre-foot detention basin located near the southwestern portion of the site. This basin would be sized to allow sediments contained in the runoff to settle and not discharge from the basin. After construction, the detention basin would be converted to a permanent stormwater-detention basin. The applicant proposes to implement a stormwater pollution prevention plan (SWPPP) and appropriate BMPs in accordance with the National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharge associated with construction activity (E&L 2006a, section 8.14.1.6).

After construction, the temporary construction areas would be returned to grazing land. The 31-acre site would be covered in gravel, except for designated roads, tanks, and buildings. Approximately 5 acres of the 31-acre site would consist of impervious surfaces such as concrete, asphalt, and buildings. The switchyard would be covered with crushed rock. Stormwater runoff from the 31-acre site would be collected by a surface drainage system and conveyed to the stormwater detention basin. The basin would be designed to detain the difference in pre- and post construction runoff due to the increase of the site's impervious surfaces (E&L 2006a, section 8.14.1.6).

The detention basin would be designed to allow sediments and on-site pollutants to settle prior to discharge. The detention basin would be sized to accommodate the peak runoff of the predevelopment condition resulting from a 10-year, 24-hour storm event and provide the required detention time for pollutant removal. The flow of stormwater would generally follow the existing drainage pattern. A portion of the plant site would be curbed (equipment areas with the potential for leakage) and stormwater within these areas would be collected and visually inspected, and then routed to the detention basin or to the oil/water separator (E&L 2006a, Appendix A, section 3.3.6.3).

The basin would be designed to empty within 48 hours or less after the cessation of a storm event, and the outflow would be discharged back to the natural drainage of the area. The applicant proposes to implement a SWPPP that describes the post construction stormwater management system and BMPs to be implemented to prevent the discharge of pollutants off site.

After construction is completed, local access roads would be repaved or resurfaced. Approximately 58 acres of the 89 acres disturbed during construction would be returned

to preconstruction conditions; the remaining 31 acres comprise the final CGS (E&L 2006a, section 8.14.1.6).

Staff recommends the adoption of the following four conditions that address mitigation measures designed to reduce any soil erosion and stormwater impacts to less than significant levels.

- Condition of Certification **SOIL & WATER-1** requires the project owner to comply with all of the requirements of the NPDES permit for discharge of stormwater associated with construction activity, including the development and implementation of a construction SWPPP.
- Condition of Certification **SOIL & WATER-2** requires the project owner to obtain compliance project manager (CPM) approval for a site-specific final drainage, erosion, and sediment control plan (DESCP) that addresses all project elements and ensures protection of water and soil resources for the construction phase of the project.
- Condition of Certification **SOIL & WATER-3** requires the project owner to comply with all requirements of the NPDES permit for discharge of stormwater associated with industrial activity, including the development and implementation of an industrial SWPPP.
- Condition of Certification **SOIL & WATER-7** requires the project owner to provide the CPM copies of all federal and state permits prior to any soil disturbing activities that would impact natural drainage, streams, or wetlands.

With the implementation of Conditions of Certification **SOIL & WATER-1, -2, -3 and -7**, staff concludes that the CGS project would mitigate any potential adverse impacts caused by erosion or stormwater discharge during construction and operation of the project.

Water Use

The CGS site is situated between the GCC and the TCC. The CGS's water requirements of approximately 130 acre-feet per year would be a small proportion of the water flowing through those canal systems. The applicant proposes to install a turn-out at the TCC instead of the GCC based on both physical and biological factors. Physically, the CGS site is at an elevation of 183 feet. The water level in the TCC near the project is generally maintained throughout the year at approximately 205 feet. The water level in the GCC is substantially lower than the site and would require construction of a pump station to convey the water to the plant (E&L 2006a, section 8.14.1.2).

The applicant and the Glenn-Colusa Irrigation District (GCID) have been negotiating the final terms of the water agreement and expect to reach agreement in the immediate future. The agreement would require the GCID to deliver 130 acre-feet per year of surface water through the TCC to Colusa County at the CGS diversion point. The GCID has an existing wheeling agreement with the TCC Authority that allows GCID to divert water at the TCC Authority's Red Bluff facilities. Colusa County is a TCC Authority member agency and has the contractual rights to the use of the TCC.

Colusa County must approve the agreement, and the applicant anticipates approval by the county. Once the three-party (GCID, CGS, and TCC Authority) agreement is finalized, the water agreement will have to be approved by the USBR. Under the terms of GCID's contract with USBR, the USBR has up to 90 days to review and approve the agreement (URS 2007g, data response 19).

Staff will not be able to complete its final assessment without the approved three-party water agreement. The approved agreement is required for staff to complete its water supply analysis and to evaluate the potential impacts to other Central Valley Project water contractors and their retail customers.

Process and Sanitary Wastewater

Two separate wastewater collection systems are proposed for the CGS. The first is the plant wastewater system, which would collect wastewater from the combustion turbine generator evaporative coolers and HRSGs, water treatment system, chemical feed-area drains, and general plant drains. The second system is the sanitary system, which would collect sanitary wastewater from sinks, toilets, and other sanitary facilities and discharge the wastewater to an on-site septic system. The sanitary system would be based on gravity flow but could include lift stations if required for proper waste disposal.

The plant wastewater system would collect all wastewater generated in the operation of the plant and deliver it to the zero liquid discharge (ZLD) system. Wastewater streams would be cycled through the water purification system and returned to the demineralizer as a make-up supply. Sludge from the demineralizer would be concentrated in a dryer and disposed of as solid waste in an approved landfill. The majority of all wastewater generated at the plant would be treated and reused on site (E&L 2006a, section 8.13.2.1.2).

Sanitary waste would be disposed of through a septic system and leach field and would need to comply with the county's sewage-disposal requirements. Staff recommends the adoption of the following two conditions that address mitigation measures designed to prevent degradation of surface water or groundwater and would reduce impacts to less than significant levels.

- Condition of Certification **SOIL & WATER-4** requires the project owner to comply with all requirements of the Colusa County sewage disposal system permit.
- Condition of Certification **SOIL & WATER-5** requires the project owner to process all industrial wastewater streams with a ZLD system that results in a residual solid waste and to operate the ZLD system in accordance with a ZLD management plan approved by the CPM.

With the implementation of Conditions of Certification **SOIL & WATER-4 and -5**, staff concludes that the CGS project would mitigate any potential adverse impacts caused by wastewater discharge during operation of the project.

CUMULATIVE IMPACTS AND MITIGATION

Temporary and permanent disturbances associated with construction of the project would cause accelerated wind- and water-induced erosion. However, staff has

concluded that the implementation of proposed mitigation measures within the construction SWPPP and the DESCP would ensure that the project would not contribute significantly to cumulative erosion and sedimentation impacts.

Industrial wastewater streams would be eliminated by the use of a ZLD system and impacts from sanitary wastewater are not expected to contribute to surface-water or groundwater degradation.

Without the terms of the final water agreement and a description of all water and or irrigation districts affected by the agreement, staff is unable to assess the impacts associated with the use of TCC water and its effects on other users of the TCC and other Central Valley Project customers. An approved water agreement must be provided for staff to complete the final staff assessment (FSA).

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the CGS project would satisfy the requirements of the NPDES permit with the adoption of Conditions of Certification **SOIL & WATER-1 and -3**, which require the development and implementation of a SWPPP for construction and industrial activity.

CALIFORNIA CONSTITUTION, ARTICLE X, SECTION 2

The state constitution 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. Through the proposed use of dry cooling in conjunction with a ZLD system, fresh inland water consumption by the CGS would be used to the fullest extent possible.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Staff has concluded that the CGS project would satisfy the requirements of the Porter-Cologne Water Quality Control Act if the project is constructed and operated as proposed.

STATE WATER RESOURCES CONTROL BOARD RESOLUTION 75-58

SWRCB Resolution 75-58 states that fresh inland waters should only be used for power-plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Staff finds that the use of fresh surface water in conjunction with dry cooling and a ZLD system is in compliance with the intent of Resolution 75-58.

WARREN-ALQUIST ACT

The Warren-Alquist Act promotes all feasible means of water conservation. The project would conserve water to the maximum extent possible through the use of dry cooling in conjunction with a ZLD system. The project proposes to use approximately 130 acre-

feet per year, which is a relatively small annual consumption for a 660 megawatt combined-cycle power plant.

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, 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 dry cooling and a ZLD system, the CGS would comply with this policy.

CONCLUSIONS

Based on the preliminary assessment of the CGS project, staff finds the following:

- potential adverse impacts caused by erosion and stormwater flows during construction and operation would be mitigated with the development and implementation of an effective stormwater pollution prevention plan and a drainage, erosion, and sediment control plan;
- the water supply for the project is consistent with state water conservation policy;
- with an approved long-term water supply agreement for approximately 130 acre-feet per year that does not cause an unmitigable adverse impact, the project would comply with all applicable federal, state, and local laws, ordinances, regulations, and standards; and
- the approved three-party water agreement must be provided for staff to complete the soil and water resources FSA.

Based on these findings, staff concludes that CGS would not result in any unmitigated, significant project-specific or cumulative adverse impacts to soil or groundwater resources and would comply with all applicable LORS if all of the recommended conditions of certification are adopted by the commission. As stated above, the impacts to surface-water resources could not be determined and staff can not complete its FSA without all terms of the agreement and a description of all users and customers that would be party to or impacted by the final water agreement.

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 discharge of stormwater associated with construction activity. The project owner shall develop and implement a construction stormwater pollution prevention plan (construction SWPPP) for the construction of the Colusa Generating Station (CGS) site, laydown area, and all linear facilities.

Verification: The project owner shall submit to the CPM a copy of the construction SWPPP prior to site mobilization and retain a copy on site. The project owner shall

submit copies to the compliance project manager (CPM) of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board regarding the NPDES permit for the discharge of stormwater associated with construction activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent to the State Water Resources Control Board, and the board's confirmation letter indicating receipt and acceptance of the notice of intent.

SOIL & WATER-2: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific drainage, erosion, and sediment control plan (DESCP). The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include a provision for stormwater retention basin(s) to capture polluted stormwater, meet Colusa County requirements, and identify all monitoring and maintenance activities. The DESCP shall contain elements A through I below outlining site management activities and erosion- and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction activities.

1. **Vicinity Map** – A map(s) at a minimum scale 1"=100' shall be provided indicating the location of all project elements (construction site, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

2. **Site Delineation** – All areas subject to soil disturbance for the CGS (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.

3. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the CGS construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

4. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale 1"=100' showing existing, interim, and proposed drainage swales and 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.

5. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion-control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features. The hydraulic analysis shall be used to support the selection of BMPs and structural

controls to divert off-site and on-site drainage around or through the CGS site and laydown and linear areas.

6. **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 locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated tying in proposed contours with existing topography.

7. **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 (project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

8. **Best Management Practices Plan** – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to prevent wind and water erosion.

9. **Best Management Practices Narrative** – The DESCP shall show the location (as identified in H above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all project element (site, pipelines) excavations and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information will be available.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Colusa County for review and comment. No later than 60 days prior to start of site mobilization, the project owner shall submit the DESCP with the county's comments to the CPM for review and approval. The CPM shall consider comments by the county before approval of the DESCP. The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **Civil-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any NPDES permit for Construction Activity. The project owner shall provide in the monthly compliance report a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

SOIL & WATER-3: The project owner shall comply with the requirements of the general NPDES permit for discharges of stormwater associated with industrial

activity. The project owner shall develop and implement an industrial stormwater pollution prevention plan (industrial SWPPP) for the operation of the Colusa Generation Station.

Verification: The project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the CGS prior to commercial operation, and shall 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 regarding the general NPDES permit for discharge of stormwater associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination for the construction SWPPP.

SOIL & WATER-4 The project owner shall install an on-site septic system designed for site-specific soil and percolation conditions. The septic system design shall comply with the State Water Resources Control Board's onsite wastewater treatment system regulations (Title 27 CCR) and Colusa County Environmental Health Division's sewage disposal system permit. The project owner shall operate the septic system following an operations and maintenance manual prepared by a qualified professional. The project owner shall monitor the septic system for detectable effects on groundwater or surface water.

Verification: No later than 90 days prior to commercial operation, the project owner shall submit to the CPM evidence that the septic system design has the approval of the chief building official (CBO), and evidence that it has been reviewed by the Colusa County Environmental Health Division.

No later than 60 days prior to commercial operation, the project owner shall submit the operations and maintenance manual to the Colusa County Environmental Health Division for review and comment. No later than 30 days prior to commercial operation, the project owner shall submit the operations and maintenance manual to the CPM for review and approval. The submittal shall include copies of any agency comments the project owner has received.

The wastewater system shall be monitored following either the general standards adopted in State Water Resources Control Board's onsite wastewater treatment system regulations or the procedures outlined in the CPM-approved operations and maintenance manual. Any testing results or correspondence exchanged between the project owner and the California Department of Health Services or the Colusa County Environmental Health Division during operations shall be provided to the CPM in the annual compliance report.

SOIL & WATER-5 The project owner shall treat all process wastewater streams with a zero liquid discharge (ZLD) system that results in a residual solid waste. The solid waste shall be disposed of in the appropriate class of landfill suitable for the constituent concentrations in the waste. Surface or subsurface disposal of process wastewater from the CGS is prohibited. The project owner shall operate the ZLD system in accordance with a ZLD management plan

approved by the CPM. The ZLD management plan shall include the following elements:

A. a flow diagram showing all water sources and wastewater disposal methods at the power plant;

B. a narrative of expected operation and maintenance of the ZLD system;

C. a narrative of the redundant or back-up wastewater disposal method to be implemented during periods of ZLD system shutdown or maintenance;

D. a maintenance schedule;

E. a description of on-site storage facilities and containment measures;

F. a table identifying influent water quality; and

G. a table characterizing the constituent concentrations of the solid waste or brine and specifying the permit limits of the selected landfill.

The CGS operation and wastewater production shall not exceed the treatment capacity of the ZLD system or result in an industrial wastewater discharge.

Verification: At least 60 days prior to the start of commercial operation, the project owner shall submit to the CPM evidence that the final design of the ZLD system has the approval of the CBO. At least 60 days prior to the start of commercial operation, the project owner shall prepare a ZLD management plan for review and approval by the CPM. The ZLD management plan shall be updated by the project owner and submitted to the CPM for review and approval if a change in water source or infrastructure is needed.

In the annual compliance report, the project owner shall submit a status report on operation of the ZLD system, including dates and length of disruptions, maintenance activities performed, volumes of interim wastewater streams stored on site, monthly volumes of residual salt cake or brine generated, and results of at least one annual sampling of the waste solids or brine comparing the constituent concentrations to the permit limits of the landfill. The annual compliance report shall contain an evaluation of whether the ZLD is being operated within the parameters described in the ZLD management plan. The ZLD management plan shall be updated by the project owner if the CPM has determined it is necessary based on the project owner's annual compliance report(s).

SOIL & WATER-6 The project owner shall use raw water from the Tehama-Colusa Canal (TCC) for all industrial, landscape irrigation, and sanitary purposes. Prior to the use of TCC water for any purpose, the project owner shall install and maintain metering devices as part of the water-supply and distribution system to monitor and record in gallons per day the total volume of water supplied to the CGS from the TCC. These metering devices shall be operational for the life of the project and must be able to record the volume of

raw water consumed for industrial use, landscape irrigation, and potable and sanitary purposes.

The project owner shall prepare an annual water use summary, which will include the monthly range and monthly average of daily raw-water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. Potable water use on site shall be recorded on a monthly basis. Following the initial report, the annual water use summary shall also include the yearly range and yearly average water use by the project. The annual water use summary shall be submitted to the CPM as part of the annual compliance report.

Verification: At least 60 days prior to commercial operation of the GCS, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the raw and potable water supply and distribution systems The project owner shall submit a water use summary to the CPM in the annual compliance report. The report shall distinguish the recorded water uses for industrial, landscape irrigation, and potable and sanitary purposes. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

SOIL & WATER-7 Prior to the initiation of any construction-related activities that could affect streambeds or wetlands, the project owner shall provide a copy of the following permits to the CPM as appropriate:

A. section 401 water quality certification or a waiver of waste discharge requirements from the Central Valley Regional Water Control Board or the State Water Resources Control Board;

B. section 404 acceptance of preconstruction notification for nationwide permit(s) from the US Army Corps of Engineers; and

C. streambed alteration agreement(s) from the California Department of Fish and Game.

Modifications of the construction techniques to be used or the location of the crossing as a result of permit conditions shall be reviewed and approved by the CPM. The project owner shall implement the terms and conditions contained in all permits.

Verification: The project owner shall submit to the CPM a copy of the applicable permits no later than 30 days prior to any construction-related activities that could affect streambeds or wetlands. Written verification from the issuing agency that a permit is not necessary can be used to satisfy this condition. Any changes shall be reviewed and approved by the CPM 60 days prior to initiating any activities that could affect streambeds or wetlands. The terms and conditions of these permits shall be incorporated into the drainage, erosion, and sediment control plan.

REFERENCES

DWR (California Department of Water Resources). 2006.*California's Groundwater.* DWR Bulletin 118. Sacramento Valley Groundwater Basin, Colusa Subbasin. January 20, 2006.

E&L2006a - E&L, LLC / A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

L&W2007b - Latham & Watkins/P. Kihm (tn: 39247). Applicant's Response to Data Request 1 through 116. Submitted to CEC/ Docket Unit on 2/13/2007.

URS2007g - URS/ D. Shileikis (tn: 39765). Responses to Questions from 2-21-07 I.R. Workshop and Responses to Emerald Farms 2-21-07 Petition to Intervene. Submitted to CEC/ Docket Unit on 3/23/2007.

TRAFFIC AND TRANSPORTATION

David Flores

SUMMARY OF CONCLUSIONS

With implementation of the recommended conditions of certification, the Colusa Generating Station (CGS) would be consistent with the Circulation Element in the Colusa County General Plan. The CGS would also be consistent with all other applicable laws, ordinances, regulations, and standards (LORS), and 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 Colusa County.

INTRODUCTION

The Traffic and Transportation section of the Preliminary Staff Assessment addresses the extent to which the project may affect the transportation system within the vicinity of its proposed location. This section analyzes the potential traffic and transportation impacts associated with construction and operation of the CGS and its ancillary systems.

This analysis includes an evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, the movement of these workers can increase roadway congestion and also affect traffic flow. The applicant, E&L Westcoast, LLC, is proposing major changes to the existing transportation network by reconstructing the Teresa Creek and the Glenn-Colusa Canal Bridges. On-going (post construction) operations and maintenance traffic would represent a negligible increase over current conditions; however, it would include an increase in the transportation of hazardous materials to the project site. The transportation of hazardous materials will need to comply with federal and state laws.

Staff has analyzed the information provided in the Application for Certification (AFC) and from other sources to determine the potential for the CGS to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

TRAFFIC AND TRANSPORTATION Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation applicable to the project.

TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR), Title 14, 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.
CFR, 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 who 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 upon 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	
Colusa County General Plan	The General Plan is the County's official position on development and resource management. The General Plan contains goals, objectives, policies, diagrams, and actions. The General Plan's Circulation element states that its goal is to " Develop and maintain an efficient circulation system to accommodate the movement of people and goods within Colusa County". All development must be consistent with the General Plan.
Colusa County General Plan Policies/ Circulation Element	The Colusa General Plan's objectives contains specific information on development application requirements, as well as standards and regulations relating to such issues as infrastructure, natural resources, and use types. The following transportation objectives are applicable to this project: • To explore new funding sources for road maintenance and improvement; • To sustain a viable rural public transit system; • To utilize the current county transportation system as framework for siting new industrial or commercial

	development; • To maintain safe and uncrowded operating conditions on all county roadways; • To reduce moving traffic hazards by installing stop signs, railroad crossing guards, and warning signs where appropriate; and • To encourage the preservation of scenic vistas. The following Circulation Policies are applicable to this project: • CIRC-8: The County should encourage the operation of Interstate 5 at Level of Service "B" or better and all roads at Level of Service "C" or better; • CIRC-9: A program for the replacement of deficient bridges should be initiated; and • CIRC-39: Any proposed pipeline or transmission line within the county shall be aligned so that interference with agriculture is minimized.

SETTING

REGIONAL DESCRIPTION

The proposed CGS project lies in a rural agricultural area of Colusa County approximately 4 miles west of the Interstate 5 transportation corridor. Interstate 5 runs north and south through the Central Valley. The project site is approximately 14 miles north of the farming community of Williams. **TRAFFIC AND TRANSPORTATION Figure 1** illustrates the major roads, potential access roads, and highways in the project area.

LOCAL ROADWAYS

General access to the CGS site would be via the following roads and freeways:

Delevan Road - This is a two-lane county maintained roadway with 12-foot lanes and minimal gravel shoulders. Delevan Road runs east-west extending east from Four Mile Road to McDermott Road. It curves to a north-south direction after McDermott Road and ends at the Colusa-Glenn County line.

McDermott Road - This is a two-lane county maintained roadway with 12-foot lanes and minimal gravel shoulders. The width of the unpaved shoulders varies throughout the corridor length. McDermott Road parallels I-5 running from Maxwell Road past the Colusa-Glenn County line to Road 68 in Glenn County.

Dirks Road - This is a short two-lane county maintained roadway with 12-foot lanes and minimal gravel shoulders. Dirks Road runs east-west and connects McDermott with Delevan Road. The portion of Dirks Road maintained by the County ends at Delevan Road and a paved private road continues to the project site.

TRAFFIC AND TRANSPORTATION Table 2 provides the classification, along with the current daily and peak hour traffic volumes, for the local and regional roadways in the vicinity of the project site.

TRAFFIC AND TRANSPORTATION Table 2
Existing Traffic Volumes in Proximity to the CGS

Name	Classification	Daily Traffic Volume	Peak Hour Traffic Volume	Current LOS
Local Roadways[a]				
Delevan Road	County Road	369	37[b]	A
McDermott Road	County Road	178	18[b]	A
Dirks Road	County Road	N/A	N/A	A
Regional Roadways[c]				
Interstate 5 (North of Delevan Road)	Freeway	26,250	2,750	B
Interstate 5 (South of Delevan Road)	Freeway	26,250	2,800	B

Notes:[a] Source: Colusa Public Works Department, 2000. Daily Bidirectional and Peak Hour traffic volumes are projected based on the growth factor applied.
[b] Assumes that 10 percent of the daily volumes would occur in the peak hour.
[c] Source: Caltrans, 2003. Daily Bidirectional and Peak Hour traffic volumes are projected based on the growth factor applied.
N/A – not available

The CGS project would also require the construction of various linear facilities. A natural gas pipeline is proposed to be installed within a private roadway. It would begin at the site, proceed east on a private roadway and connect to the existing PG&E compressor station. Total length of the 8-inch pipeline is approximately 1,500 feet long. All other linear facilities would be contained on the site or would not be constructed within road rights-of-way.

AIRPORTS

The Glenn County Airport is located approximately 8 miles north of the proposed project site on I-5. The Colusa County Airport is approximately 20 miles south via I-5 and State Highway 20. Sacramento International Airport is 65 miles south via I-5.

RAILROADS

Heavy equipment items would be brought in by rail to an unloading depot located in Williams which has suitable tracks and sufficient space around the track for unloading of

equipment. The equipment would then be transported to the site by a contracted heavy equipment hauler. Union Pacific Railroad owns the rail line but it is operated by the California Northern Railroad.

PUBLIC TRANSPORTATION AND BICYCLE ROUTES

Colusa County does not currently provide public transportation in the project area. There are no designated bicycle routes located along the roadways that would be affected by the project.

ACCIDENT HISTORY

For highway segments, accident rates are computed as the number of accidents per million vehicle-miles of travel (MVM) over a six-year period. The statewide average accident rate for a similar highway segment is approximately 3 per MVM, with a wide range of variability. Accidents on county roadways are reported as the total number of accidents by severity and not as accident rates because of the very low traffic volumes. (CGS 2006a, AFC pg. 8.10-2)

The applicant's AFC data indicates that the primary access routes to the power plant site have accident rates well below the statewide average for similar types of roadways. None of the recorded accidents occurred at railroad crossings. This level of accident history does not indicate any unusual hazard or improperly designed facilities along these roads. Accident rates for selected roadways for 1994 through 2005 are shown in **TRAFFIC AND TRANSPORTATION Table 3.**

TRAFFIC AND TRANSPORTATION Table 3
1994-2005 Accident History

Local Roadways [a]	**Number of Vehicle Crashes 1994-2005**
McDermott Road	1 Property Damage (1998)
McDermott Road and Dirks Road	1 Injury (1999)
Freeways [b]	**Vehicle Crashes per Million Vehicle-Miles (1998-2000)**
I-5 (North Maxwell-Delevan Road)	0.16
I-5 (Delevan Road-Colusa Co. Line)	0.28
I-5 Northbound Offramp	0.00
I-5 Northbound Onramp	0.00
I-5 Southbound Offramp	0.00
I-5 Southbound Onramp	0.00
Notes: (a) Source: Colusa County, 2005 (b) Source: Caltrans, 2003, data about 2001	

Source CGS 2006a, AFC Table 8.10-4

LEVEL OF SERVICE

TRAFFIC AND TRANSPORTATION Table 4 explains the Level of Service (LOS) definitions used by Colusa County, Caltrans and staff to analyze traffic impacts on roads by peak hour intersection capacity and operations. Intersection level of service is identified with letters of designation, from LOS A for free flowing traffic to LOS F for most congested. LOS C is the targeted rating for the County.

TRAFFIC AND TRANSPORTATION Table 4
Level of Service Designations

LOS	Percent Time Delay (Local Roadways)	Maximum Density (Pc/Mi/Ln) (Freeways)
A	<40.0	<7.0
B	>40.0 – 55.0	>7.0-11.0
C	>55.0- 70.0	>11.0-16.0
D	>70.0 – 85.0	>16.0-22.0
E	>85.0	>22.0-28.0
F	n/a	>28.0

Source: Transportation Research Board, 2004, Highway Capacity Manual, Transportation Research Board, 2000.
Note: Pc/Mi/Ln = Passenger Cars per Mile per Lane
Density is the number of vehicles occupying a given length (one mile) of one lane of roadway at a given instant.

Source: AFC Table 8.10-2 & 3

Based on discussion with the applicant and the County of Colusa, there has been no significant growth in traffic volumes in the vicinity of the project. Delevan, McDermott, and Dirks roads all currently operate at LOS A. Each of the study roadway segments currently has a very low traffic volume of less than 40 vehicles during peak hours. A two-lane road can accommodate up to 1,000 vehicles an hour at an acceptable service level (LOS D or better).

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.

When evaluating a project's potential impact on the local transportation system, staff uses levels of service measurements as the foundation on which to base its analysis. LOS measurements represent the flow of traffic. In general, LOS ranges from "A" with free flowing traffic, to "F" which is heavily congested with flow stopping frequently. The following discussion identifies potential traffic impacts associated with the construction of the CGS, and provides an explanation of the impact conclusion.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

The project is expected to generate 214 daily trips (428 round trips) during the average construction period and 446 daily trips (892 round trips) during the peak construction period. These total daily vehicle trip volumes are based on the applicant's assumptions that part of the workforce will carpool and average vehicle occupancy will be 1.5 persons per vehicle. Construction of the proposed facility, including the generating facility, waterline, gas pipeline, and electric transmission line, would take approximately 22 to 24 months. Full-time construction staff at the facility would consist of 125 employees on average and approximately 462 construction trips which includes16 daily one-way delivery truck trips during peak construction months (months 13-16) (CGS 2006a, AFC pg. 8.10-5)

The construction workforce would increase the peak-hour traffic on I-5 slightly. The distribution of construction workers is estimated as follows: 5 percent from Glenn County/Colusa County, 45 percent form the Greater Sacramento area and 50 percent from the East Bay. Therefore 95 percent of the construction workers would be heading north on I-5, and 5 percent heading south on I-5 to access the project site. This increase would not result in any change or decrease in LOS (LOS B); therefore, the impact is expected to be less than significant.

The construction workforce traffic would increase traffic volumes on local roadways to a greater extent than volumes on state roadways. The work schedule has been estimated on the basis of a single shift, 8 hours/per day and 40 hours/per week. However, occasional use of a second shift may be necessary to make up schedule deficiencies or to complete critical construction activities. During the startup and testing phase of the project, some activities may continue 24 hours per day, 7 days per week. This increase would be temporary and heaviest during the "active" portion of the construction schedule but would not decrease the current LOS on local roads to an unacceptable level (LOS D).

TRAFFIC AND TRANSPORTATION Table 5 summarizes the trips generated by CGS during the peak construction months with 315 trips occurring during peak hour, which is based on a worker ridesharing assumption of 1.5 persons per vehicle.

TRAFFIC AND TRANSPORTATION Table 5
Colusa Generating Station Vehicle Trip Generation

Vehicle Type	One Way Peak[a] Daily Trips	Peak Hour Trips
Construction Personnel[b]	446	312[c]
Construction Delivery Trucks[d]	16	3
Construction Total	**462**	**315**
Power Plant Personnel	31	18[c]
Operations Delivery Trucks[d]	3	1
Operations Total	34	**19**

Notes: [a] "Peak" refers to the scheduled peak construction month. Peak workforce during this month is expected to be 646 persons.
[b] Assumes that part of the work force will carpool (1.5 persons per vehicle)
[c] Assumes that 70 percent of workers will arrive and depart in the morning and evening peak hours, respectively.
[d] Assumes that approximately 20 percent of the delivery trucks will arrive in the peak period.

Source: AFC Table 8.10-6

It should be noted, that construction workers usually arrive early in the morning and depart early in the evening before the peak traffic hour on the roadway begins. The arrival and departure of the construction workers during the peak hour was assumed to provide a conservative traffic analysis (CGS 2006, pg. 8.10-5).

For roadway segments, the applicant used the Highway Capacity Software (HCS 3), which incorporates the methodology of the Transportation Research Board's 2000 *Highway Capacity Manual (HCM)*. This program assigns a LOS designation based upon percent Time Delay (for local roadways) and Maximum Density (for freeways). Staff reviewed these sections of the HCM and concurred with their approach in analyzing the road segments in the project area.

The construction traffic resulting from the proposed project is expected to change the peak hour operating conditions on Delevan and McDermott roads from the existing LOS A to LOS B. **TRAFFIC AND TRANSPORTATION Table 6** summaries the existing and future Level of Service on key roadways in the area of CGS.

This change would occur only during the peak construction months, which are scheduled to last between 4 to 6 months. During the average construction months, LOS is expected to remain at LOS A. During the same peak construction months, traffic on I-5 south of Delevan Road is expected to continue to operate at LOS B.

TRAFFIC AND TRANSPORTATION Table 6
Roadway Level of Service

	Existing Conditions	Existing Conditions Plus Peak Project Construction Traffic	Existing Conditions Plus Operation Traffic
Street Segment	**LOS**	**LOS**	**LOS**
Delevan Road	A	B	A
McDermott Road	A	B	A
Dirks Road[1]	A	B	A
I-5 South of Delevan Road	B	B	B

Notes:
[1] Assumed the LOS of Dirks Road is similar to that of Delevan and McDermott roads because no traffic data was available, but traffic is believed to be less than that of Delevan or McDermott roads.
LOS= Level of Service

Source: AFC Table 8.10-7

The addition of construction/operation traffic to the roadway identified in this report only represents a minor percentage of traffic and does not significantly reduce the LOS, and would possibility cause a short-term increase in traffic congestion during bridge reconstruction. Therefore, impact mitigation in the form of a construction traffic control plan and implementation program that provides for safety measures during construction of the bridge replacement and temporary road/bridge detour, should be developed in coordination with the County of Colusa and Caltrans to offset this project impact. The Applicant has indicated their intent to provide such a plan (see Condition of Certification **TRANS-1**).

The applicant has indicated their intent to prepare a traffic control plan related to the construction of the bridge replacement on McDermott Road which will include a discussion on the use of flagmen, advanced warning flashers, and signage for temporary lane closures.

The applicant has offered to mitigate potential traffic impacts, particularly during the construction of the bridge replacement through the various traffic control plan measures noted above. Therefore, staff has concluded that with mitigation incorporated, traffic impacts during the construction phase will be less than significant.

Traffic Hazards

The existing Teresa Creek Bridge on McDermott Road, the Glenn-Colusa Bridge on Dirks Road, and the turning radius at the Delevan Road/McDermott Road intersection

are not adequate to accommodate heavy construction truck traffic. Therefore, the applicant will be working with the Colusa County Public Works Department to replace the Teresa Creek and Glenn-Colusa Bridges, and provide additional gravel on the northeast and southeast corners of the Delevan Road/McDermott Road intersection. Staff is proposing Condition of Certification **TRANS-2** to repair any damage to McDermott and Delevan Roads from construction traffic, particularly heavy trucks.

During reconstruction of the Teresa Creek Bridge, a temporary 14-foot wide bridge and detour road would be installed immediately downstream of the existing bridge, allowing traffic to pass through the area. The applicant will need to secure necessary approvals from the adjacent property owner for the temporary bridge and road realignment.

The applicant has proposed an alternative option if the installation of the temporary bridge across Teresa Creek is infeasible. This would entail detouring and rerouting

traffic on either I-5 or State Highway 99 West to the Road 68 exit north of the Delevan Road exit, west on Road 68 and south on McDermott Road. As reflected in Table 8.10-8, Table 8.10-10 and Appendix M, an LOS analysis was completed to assess roadway operational performance based on existing and future traffic conditions if the alternative option was chosen. The analysis indicated that the proposed detour route would not cause LOS deterioration on any of the studied road segments, and would remain at LOS B.

Although the addition of construction traffic on McDermott Road would not significantly reduce the LOS and impacts would only occur on a temporary basis (i.e., during the 22-24 month construction phase of the project), it may cause a short-term increase in delays and minor congestion during construction of the Teresa Creek Bridge replacement on McDermott Road. Therefore, development and implementation of a construction traffic control plan should be required to offset these temporary impacts (see Condition of Certification **TRANS-1**).

In addition to the Teresa Creek Bridge replacement, the existing bridge over the Glenn-Colusa Canal will also need to be replaced to accommodate the heavy truck loads. Additional roadway easements will also be necessary for the newly constructed bridge. The existing bridge will remain operational until the new bridge is completed. See **TRAFFIC AND TRANSPORTATION Figure 2** for location of planned roadway/bridge improvements.

The applicant has also stated its intent to design site access/egress to accommodate construction trucks on the private access road to the project site and to comply with all weight and load limitations on state and local roadways. In addition, the applicant will use the *Caltrans Standard Plans* that provide guidelines for traffic control and lane closures for construction work. Therefore, staff concludes that there is a less than significant impact.

Impacts on Air Traffic Patterns

There are no major commercial aviation centers or rural landing strips in the vicinity of the CGS site. The closest local airport is the Glenn County Airport, approximately eight

miles north of the proposed project site on I-5. The CGS would not conflict with the aircraft runway approach. Therefore, there will be no impact.

Emergency Access

The project would not lead to inadequate emergency vehicle access because roadways affected by construction would be maintained at an acceptable service level (LOS B) in accordance with Colusa County's East General Plan.

The closest fire station within Colusa County that provides emergency fire and medical services is the Maxwell Fire Protection District's Maxwell rural station located approximately 7.5 miles from the project site in the community of Maxwell. The response time from this station is approximately 15-20 minutes. Fire fighters are trained to handle emergency first aid. The mostly likely emergency route would be north on I-5, west on Delevan Road, north on McDermott Road and west on Dirks Road to the project site. If emergency evacuation is needed, the County is under contract with Enloe Ambulance Service out of Williams. Enloe also provides emergency helicopter service, and would originate out of Chico. Response time would be approximately 25 minutes. See the **HAZARDOUS MATERIALS MANAGEMENT** and the **WASTE MANAGEMENT** sections of the Staff Assessment for additional information on emergency services.

Acceptable service levels will be maintained through the implementation of a construction traffic control plan. Therefore, no traffic congestion affecting emergency access is expected on McDermott Road or Dirks Road near the project site.

Parking Capacity

Staff has concluded that adequate parking would be available during the peak construction phase of the proposed project, given the applicant's proposed parking area on the project site (approximately 43 acres). This onsite parking area would accommodate all passenger and truck vehicles during the peak construction months. Therefore, development and implementation of an off-site construction employee-parking plan would not be necessary. Given the applicant's commitment to provide on-site parking, staff has concluded that there is no impact.

Operational Impacts and Mitigation

Commute and Visitor Traffic

The operational phase of the CGS would require the addition of 31 full-time employees. Adequate parking would be available for these employees on site. The existing state highway and county roadway system would not be affected by any increase in commute traffic associated with the operation of CGS. Therefore, the commuter and visitor traffic associated with the operational phase of the project is not expected to cause any significant traffic impacts.

Transport of Hazardous Materials and Waste

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. In order to minimize potential impacts, all hazardous material deliveries should be routed as follows from I-5 to Delevan Road, north on McDermott Road and left (west) on Dirks Road into the plant site.

Staff's visual observations of the roadway system from I-5/McDermott/Dirks Roads to the proposed project site indicate that there are no unusual hazards. Staff has concluded that the roadways can sufficiently and safely handle the delivery of aqueous ammonia and other hazardous materials by approximately 5-7 trucks per month without incident.

Impacts associated with hazardous material transport to the facility can be mitigated to a level of insignificance 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.

The California Department of Motor Vehicles specifically 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 two truck trips every three months. In addition, there would be two special trick trips every three to five years when the plant is shut down for maintenance. 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 near the communities of Buttonwillow and Kettleman City in Kern County 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.

Linear Facilities

The operation of linear facilities that would serve the CGS are not expected to adversely impact area roadways. The only operational activities that could affect traffic conditions are short-term maintenance or unplanned difficulties. These events are typically limited in duration and are not expected to cause any significant impacts, in a rural area that has relatively little existing traffic.

CUMULATIVE IMPACTS AND MITIGATION

One proposed project has been identified which would occur approximately 8 miles southeast of the project area. This potential project is described as an 18-unit housing

subdivision near the community of Maxwell, located approximately 5 miles southeast of the CGS site.

In regard to the potential for temporary cumulative traffic impacts associated with the 18-unit housing subdivision, no cumulative impacts from the CGS project on traffic are expected as the project is still in the preliminary stages, and no formal application has been filed with the county.

Temporary project impacts associated with the reconstruction of the Teresa Creek Bridge and rerouting of McDermott Road during the reconstruction work will be mitigated through implementation of a project traffic control plan. Given this mitigation, regional and local roadways are considered to have adequate capacity to accommodate related construction traffic.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all applicable LORS (PEC 2006a, Section 5.11.5). Staff has concluded that the project as proposed would comply with relevant LORS. **TRAFFIC AND TRANSPORTATION Table 7** presents the project's conformance with all applicable LORS.

TRAFFIC & TRANSPORTATION Table 7
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal: Code of Federal Regulations (CFR) Title 14, 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 project is not located within 20,000 feet of any airport and its structures would not penetrate any navigable airspace. The applicant is not required to file a "Notice of Proposed Construction or Alteration" with the FAA. In addition the project does not have any structure exceeding 200 feet in height which also triggers a notification to the FAA.
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 who 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., Colusa 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: Colusa County General Plan Policies/ Circulation Element.	The Colusa General Plan's objectives contain specific information on development application requirements, as well as standards and regulations relating to such issues as infrastructure, natural resources, and use types. The following transportation objectives are applicable to this project: • To explore new funding sources for road maintenance and improvement; • To sustain a viable rural public transit system; • To utilize the current county transportation system as framework for siting new industrial or commercial development; • To maintain safe and uncrowded operating conditions on all county roadways; • To reduce moving traffic hazards by installing stop signs, railroad crossing guards, and warning signs where appropriate; and • To encourage the preservation of scenic vistas. The following Circulation Policies are applicable to this project: • CIRC-8: The County should encourage the operation of Interstate 5 at Level of Service "B" or better and all roads at Level of Service "C" or better; • CIRC-9: A program for the replacement of deficient bridges should be initiated; and • CIRC-39: Any proposed pipeline or transmission line within the county shall be aligned so that interference with agriculture is minimized.
	Consistent: The Colusa County General Plan's Objectives would be met by the applicant providing funding for the two bridge replacements, would provide adequate safety measures to maintain safe operating conditions, obtain necessary encroachment permits, weight limit permits, and would reduce traffic hazards by constructing intersection improvements in areas of the project's traffic routes. The Colusa County General Plan's Circulation Element acknowledges that the road system in the project area should operate at LOS C or better. The proposed CGS would not cause a significant deterioration of LOS at the studied roadway segments (CGS 2001a, AFC Appendix M), specifically Delevan Road, McDermott Road, and Dirk Road. The anticipated LOS would remain good for all roadway sections with the addition of anticipated project related construction traffic, with all studied road sections continuing to operate at LOS B or better.

NOTEWORTHLY PUBLIC BENEFITS

No noteworthy public traffic and transportation benefits have been identified.

CONCLUSIONS

Provided that the Applicant develops a construction traffic control and implementation program, and follows all LORS acceptable to Colusa County and Caltrans for the handling of hazardous materials, the project would result in less than significant

impacts. If the Commission approves the project, staff recommends the adoption of the following conditions of certification to mitigate potential project impacts.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall complete the Teresa Creek Bridge and Glenn-Colusa Canal Bridge replacements, prior to project construction. The construction traffic control and transportation plan shall address the reconstruction of the Teresa Creek Bridge and Glenn-Colusa Canal Bridge including:

- Signing, lighting, and traffic control device placement;
- Temporary travel lane closures;
- Maintaining access to adjacent residential and commercial properties; and
- Emergency access.

Verification: At least 30 days prior to bridge site mobilization, the project owner shall provide to the Colusa County Public Works staff for review and comment, and to the CPM for review and approval, a copy of their construction traffic control plan and transportation demand implementation program.

TRANS-2 The project owner shall repair affected public rights-of-way (e.g., highway, road, pedestrian path, et cetera) to original or near original condition that have been damaged due to construction activities conducted for the project and its associated facilities.

Prior to start of site mobilization, the project owner shall notify the Colusa County Department of Public Works about the schedule for project construction.

Verification: Prior to the start of site mobilization, the project owner shall photograph, or videotape the following public right-of-way segment(s) (includes intersections): Delevan Road, McDermott Road and Dirks Road. The project owner shall provide the CPM, and Colusa County Department of Public Works with a copy of these images.

Within 60 calendar days after completion of construction, the project owner shall meet with the CPM and the Colusa County Department of Public Works, to identify sections of public right-of-way to be repaired, to establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide to the CPM a letter signed by the Colusa County Department of Public Works, and Caltrans stating their satisfaction with the repairs.

REFERENCES

Colusa County. Colusa County 1989. Colusa County General Plan–Final. Adopted January 13,1989. Published March 1989. Prepared by Sedway Cooke Associates.

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Transportation Research Board. 2000. Highway Capacity Manual.

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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 computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

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

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-way Stop Control - All-way Stop Control
Level of Service		
A	Free-flow	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow	Tolerable delay
E	Unstable flow	Limit of acceptable delay
F	Forced or breakdown flow	Unacceptable delay
Source: Highway Capacity Manual 2000		

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.
Source: Highway Capacity Manual 2000	

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, frustration, fuel consumption, and

increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

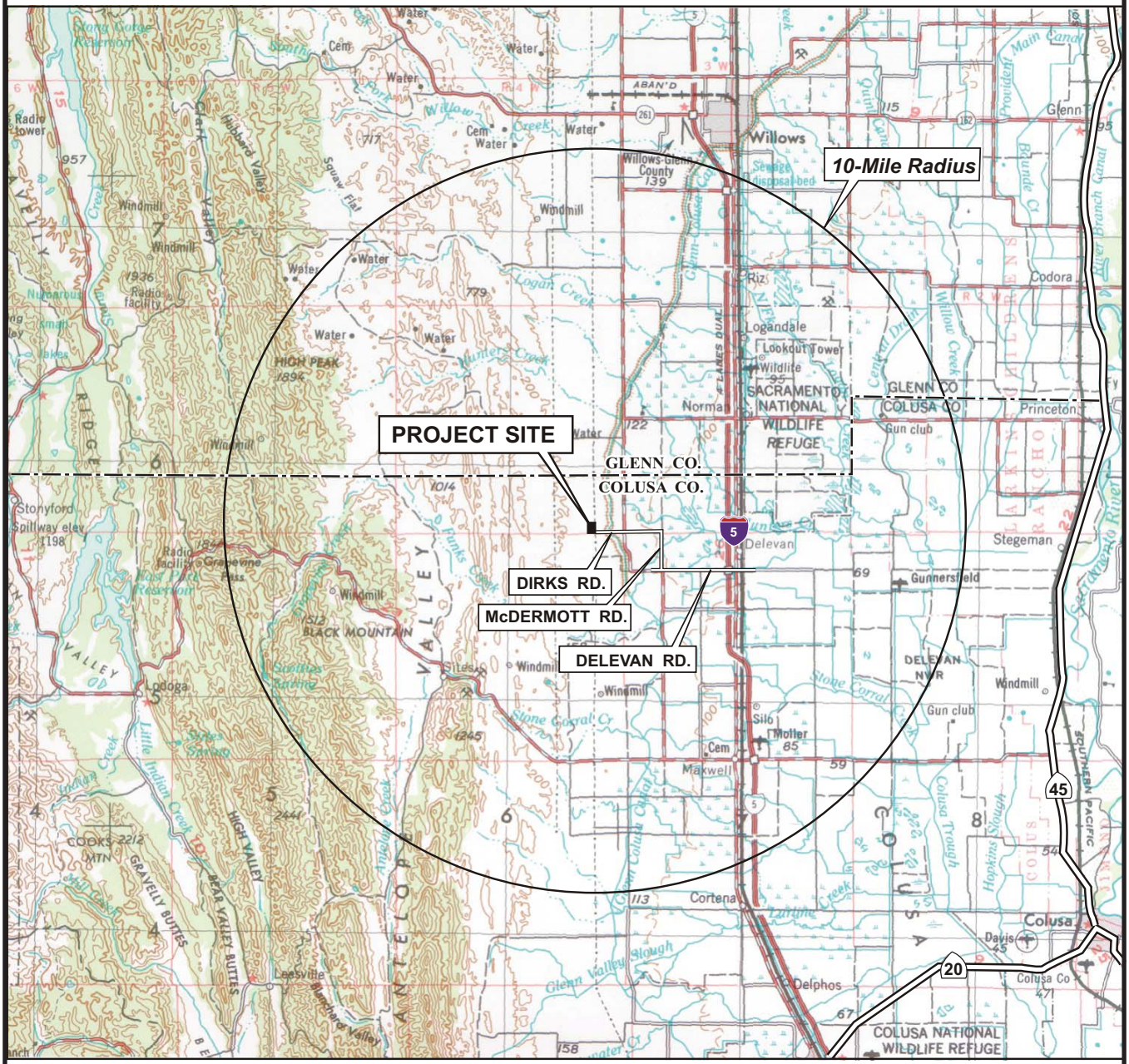
Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.
Source: Highway Capacity Manual 2000	

REFERENCE

Transportation Research Board. Highway Capacity Manual 2000. Washington, D.C.

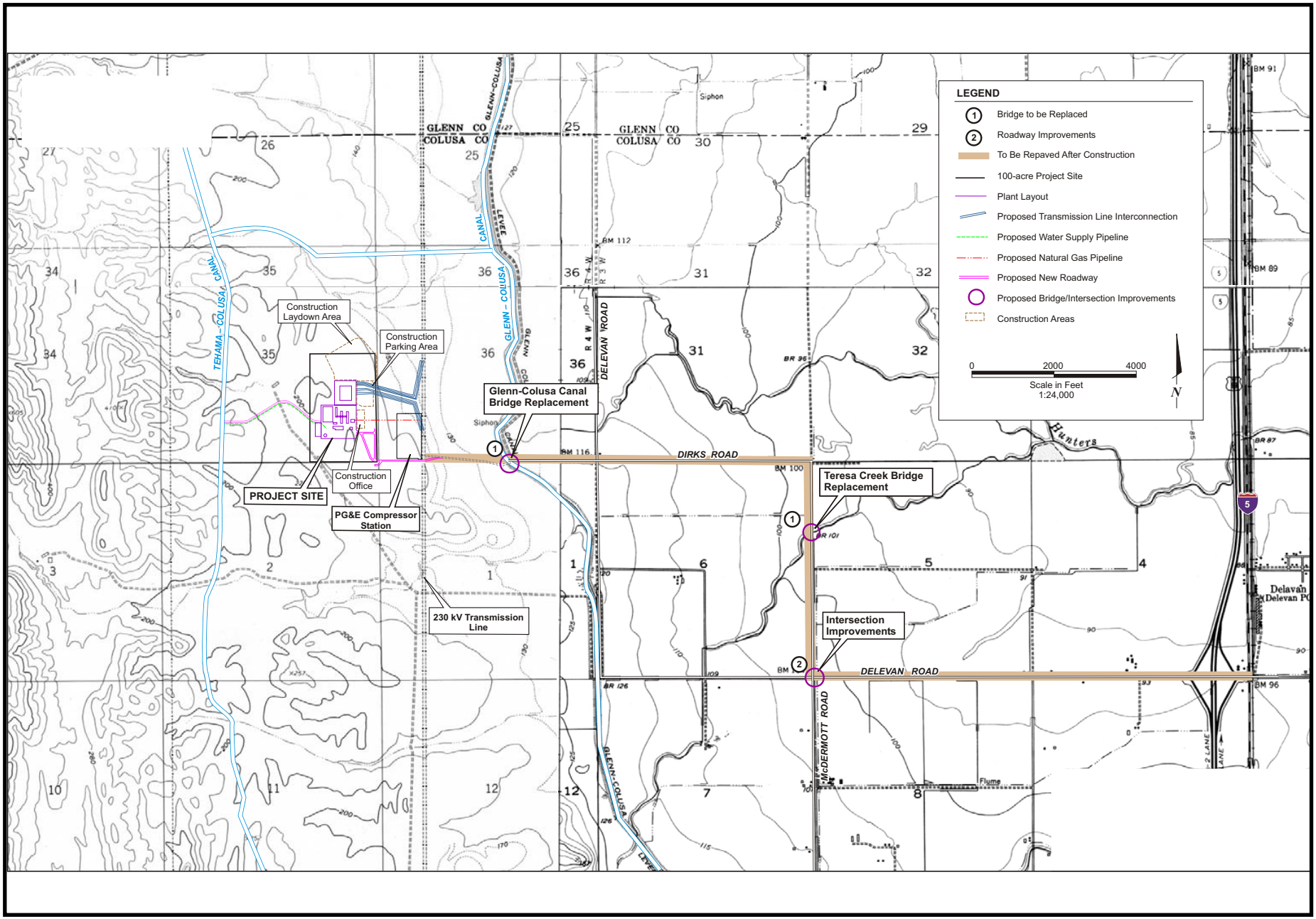
TRAFFIC AND TRANSPORTATION - FIGURE 1
Colusa Generating Station - Regional Transportation Facilities



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007
SOURCE: AFC Figure 8.10-1

TRAFFIC AND TRANSPORTATION - FIGURE 2

Colusa Generating Station - Local Transportation Facilities and Planned Roadway Improvements



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.10.2

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The design and operational plan for the proposed Colusa Generating Station (CGS) transmission line would be adequate for safe operation while ensuring that the generated electric and magnetic fields are managed to an extent California Energy Commission (Energy Commission) staff considers appropriate in light of the available safety and health effects information. The long-term, residential magnetic field exposure of particular health concern in recent years would be insignificant as the line would be routed through an area with no nearby residences. On-site worker or public exposure would be short-term and at levels expected from Pacific Gas and Electric Company (PG&E) lines of similar designs and current-carrying capacity. Since the proposed design would be adequate to minimize the safety and nuisance impacts of specific concern to staff, staff does not recommend further mitigation. Staff's recommended conditions of certification are intended to ensure implementation of related mitigation measures as proposed by the applicant.

INTRODUCTION

The purpose of this analysis is to assess the applicant's construction and operational plan for incorporation of measures necessary to minimize the transmission lines' field and non-field impacts, the reduction of which remains the focus of current laws, ordinances, regulations, and standards (LORS). If the proposed plan is found adequate, staff would recommend approval with respect to the issues of concern in this analysis; if not, staff would recommend appropriate revisions. Staff's analysis focuses on the following main issues as related primarily to the physical presence of the line and related facilities or, secondarily, to the physical interactions of their electric and magnetic fields:

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

TRANSMISSION LINE SAFETY AND NUISANCE TABLE 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
AVIATION SAFETY	
Federal	
Title 14, Code of Federal Regulations (CFR) Section 77, ”Objects Affecting the Navigable 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. 70/7460-2H, “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, CFR Section 77.
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	Not to exceed applicable local noise ordinances. (No design-specific federal or state regulations exist for noise from transmission lines.)
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	Specifies requirements and minimum standards for safely installing, operating, working around,

Applicable LORS	Description
seq, “High Voltage Safety Orders”	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	
CPUC GO-131-D, ”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/IEE) 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.
FIRE HAZARDS	
State	
Title 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.
CPUC GO-95 Section 35, “Rules for Overhead Electric Line Construction”	Covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire hazards.

SETTING

According to information from the applicant, E&L Westcoast, LLC (E&LW, 2006a, pp.1-1, 1-2, 1-4, 3-1, 3-25, 5-1, and 8.4-2), the power from the proposed CGS would be transmitted to the PG&E transmission grid by looping the four north-south 230-kilovolt (kV) Cottonwood to Vaca-Dixon lines into the new project switchyard and then back to the transmission corridor, which is approximately 1,800 feet east of the CGS site. This would mean a total of eight 1,800-foot double-circuit lines (four in and four out) between the CSG switchyard and the Cottonwood to Vaca-Dixon line corridor. The proposed

CGS and related line would be sited in a rural, mostly agricultural area with only 8 residential homes near or within a three-mile radius of the site. The nearest of these residences is approximately 1.7 miles to the southeast. Such general absence of residences means that the residential field exposure at the root of the health concern related to electric transmission lines in recent years would be insignificant for the project. The only project-related exposures of potential significance are the short-term exposure of plant workers, regulatory inspectors, maintenance personnel, visitors, and individuals in the immediate vicinity of the line. These types of exposure are short term and well understood as not significantly related to health concerns.

As noted in the **Project Description** section, the proposed line would consist of the segments listed below:

- an on-site 230-kV switchyard;
- the eight 1,800 foot-long, 230-kV lines used for the looping connection between the project's on-site switchyard and PG&E's four 230-kV Cottonwood to Vaca-Dixon lines; and
- twelve new double-circuit lattice steel transmission towers on which the lines would be carried.

The lines' basic configuration are from PG&E's safety and field-reducing design guidelines as applied to its 230-kV lines of a similar voltage and current-carrying capacity. The applicant has provided related dimensional support structure drawings along with applicable safety, reliability, and field strength reduction information (E&LW, 2006a, pp. 5-9 through 5-11). The height would be between 100 feet and 125 feet depending on terrain and would provide a minimum conductor height of 45 feet.

Since the proposed transmission line would be designed and operated according to standard PG&E practices, its design-driven electric and magnetic field strengths (and, therefore, potential contribution to existing area field levels) should, in keeping with present CPUC policy, be at the same level as other PG&E lines of the same voltage and current-carrying capacity. The requirements of this CPUC policy are specified as the General Orders noted in Table 1.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The potential for ensuring line safety and optimum EMF reduction without affecting line efficiency, maintainability, and reliability depends on compliance with the listed LORS and their related mitigation measures, which have been established as adequate to maintain any impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, it would also conclude that any transmission line 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

The possibility of area aircraft colliding with structures in the navigable air space pose a hazard that may require the filing of a “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA as noted in the LORS section above. 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. FAA notification is required for all structures over 200 feet and may be required for structures under 200 feet in restricted airspaces near airports. The dimensions of the restricted airspace are specified according to the lengths of the particular runways involved. For airports with runways longer than 3,200 feet, the restricted airspace extends to 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted air space is reduced to 10, 000 feet. For heliports, the restricted air space is 5,000 feet.

As noted by the applicant (E&LW, 2006a, p. 5-13), the height of the line support would be at a maximum of 125 feet, and would be significantly below the 200-foot FAA notification threshold for aviation safety for all area airports. Moreover, there are no public-use airports in the vicinity of the proposed transmission line corridor. The proposed CGS transmission towers and lines are in an area with other PG&E towers and lines of similar physical dimensions and will not pose any additional aviation hazard in the area. Therefore, staff considers the proposed transmission lines and related facilities as not posing a significant aviation hazard to area aircraft. No FAA “Notice of Construction or Alteration” would be required.

Interference with Radio-Frequency Communication

Radio-frequency interference is one of the indirect effects of transmission line operation. Such interference is due to 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 AM radio or television signal reception or as interference with other forms of radio communication. Since the level of interference depends on site-specific 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. Just as important is the specific cause of the interference. Loose hardware or other physical problems can cause the largest amount of interference and are easily corrected by tightening or replacing the responsible hardware. The potential for such impacts is, therefore, minimized by reducing electric fields, locating the line away from inhabited areas, and by proper maintenance and prompt response to any complaints. Most such complaints are normally linked to correctable hardware installation problems. Since corona discharge increases line energy losses, utilities have a vested interest in correcting these situations.

The proposed CGS would be built and maintained according to 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 higher, not the proposed 230-kV lines. Low-corona designs would be used as with PG&E lines of similar voltage rating. Since these existing PG&E lines do not generally produce the corona-related complaints, staff does not expect any corona-related radio-frequency interference or related complaints in the general project area. The noted absence of residences in the project area would prevent the residential radio-frequency effects of concern. However, staff has recommended Condition of Certification **TLSN-3** to ensure mitigation in the unlikely event of such a complaint.

Audible Noise

Designs that reduce electric field intensity are not specifically mandated by federal or state regulations for limiting audible noise. As with radio noise, audible noise is limited instead through design, construction, or maintenance practices established from industry research and experience. 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 audible 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 for CGS. Research by the Electric Power Research Institute (EPRI 1982) has validated this position by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot right-of-way.

The low-corona design to be used for the proposed line is the same as that used for similar PG&E transmission lines to minimize the potential for corona-related audible noise. Therefore, the proposed line operation would be unlikely to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed transmission lines and related facilities, please refer to staff's analysis in the **Noise and Vibration** section.

Fire Hazards

The fire hazards addressed through the above-referenced LORS are those that could be caused by sparks from conductors of overhead lines or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for all PG&E lines would be implemented for the proposed CGS lines (E&LW, 2006a, page 3-26). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line. Such shocks are capable of causing 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 through compliance with the requirements that specify the national standard minimum safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to comply with GO-95 (CGS 2006a, pp. 3-26 and 3-31) 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 energized transmission lines. Such electric charges are induced in different ways by the line electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute and the Institute of Electrical and Electronics Engineers. The applicant would be responsible for ensuring compliance with these grounding-related practices within the right-of-way through standard industry grounding practices (CGS 2006a, page 3-26). Staff recommends Condition of Certification **TLSN-2** 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 fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify 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. In light of the present uncertainty, staff, therefore, considers it appropriate to recommend reduction of such fields as much as is 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 by the agencies that have done so:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State Standards

The CPUC, which regulates the installation and operation of high-voltage lines in California, has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within its respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. 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 Decisions 93-11-013 and 06-08-019.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local 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 extent of such applications would be reflected by ground-level field strengths as measured during operation. Field strengths 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 the CPUC currently requires that each new line in California be designed according to the EMF-reducing guidelines of the main 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.

Industrial Standards

The present focus is on magnetic fields because only they can penetrate soil, vegetation, buildings, and other materials to produce the residential exposures at the root of the health concern of recent years. As one focuses on the magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines is lower level, but long-term. Scientists have not established if either of these types of exposures is biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

Specific field strength-reducing measures would be incorporated into the design of the proposed transmission lines to ensure the field strength minimization currently required by the CPUC. The field reduction measures to be applied include the following:

1. increasing the distance between the conductors and the ground;

2. reducing the spacing between the conductors;

3. minimizing the current in the line; and

4. arranging current flow to maximize the cancellation effects of interacting fields.

Since optimum field-reducing measures would be incorporated into the proposed line design, staff considers further mitigation to be unnecessary, but would seek to validate the applicant's assumed efficiency of EMF field strength reductions. For this reason, staff recommends Condition of Certification **TLSN-4** to assess field strengths at the expected points of maximum levels.

HEALTH AND SAFETY RISKS TO CHILDREN

The field-reducing and safety designs for the proposed and similar lines were established to ensure the protection of both adults and children against the impacts of concern in this analysis. Therefore, operations would not pose a significant risk to any children in the immediate vicinity. Moreover, the general absence of residences would further minimize the potential of children to be exposed during operations.

CUMULATIVE IMPACTS AND MITIGATION

Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.). Since the proposed transmission lines would be designed according to applicable field-reducing PG&E guidelines (as currently required by the CPUC for effective field management), staff expects the resulting fields to be similar in intensity to fields from PG&E lines of the similar voltage and current-carrying capacity. Any

contribution to cumulative area exposures would be at similar levels. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The applicant (E&LW, 2006a, pp. 3-25, 3-26, 5-3, and 5-8) calculated the strengths of the fields to be encountered along the proposed CGS lines and the existing PG&E lines to be interconnected. The results show that the maximum magnetic field intensity of 85 mG would be encountered at the point of connection with the existing Cottonwood to Vaca-Dixon line and would diminish to 3.8 mG about 250 feet from there. This maximum value is what staff would expect for similar PG&E lines and much lower than the 250 mG specified by the few states with regulatory limits on line magnetic fields. The maximum electric field intensity of 0.88 volts/meter (V/m) is at a level not associated with the electric field effects of concern to staff. 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-4**.

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 safety and field strength-reducing guidelines of the main area utility lines to which the line is interconnected. The utility in this case is PG&E, which would own and operate the lines. Since the lines 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 proposed design and operational plan to be in compliance with the LORS identified 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-4**.

In the **Socioeconomics** section of the staff analysis, staff presents census tract information (as identified in **Socioeconomics Figure 1)** that shows minority populations are less than 50 percent of the population within one-mile and six-mile radius of the project. Therefore, there are no environmental justice issues associated with this project as it relates to the **Transmission Line Safety and Nuisance** analysis.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

Staff will address any public and agency comments it receives in the Final Staff Assessment (FSA).

CONCLUSIONS

Staff does not consider the proposed CGS transmission lines and related facilities as posing a risk of the hazards of concern in this analysis. The lines are not near enough to any area airport to pose an aviation hazard according to current FAA criteria and the proposed transmission lines and related towers are of a similar height as the existing PG&E transmission lines and towers in the area. Therefore, 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 generally associated with radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of General Order 95. Compliance with Title 14, California Code of Regulations Section 1250 would minimize fire hazards. Nuisance and hazardous shocks would be minimized through standard PG&E grounding practices for similar lines.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed CGS 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 design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent CPUC considers appropriate in light of the available safety and health effects information. The long-term, mostly residential magnetic field exposure at the root of health concern of recent years would be insignificant for the proposed line given the general absence of residences in the area. On-site worker or public exposure would be short term and at levels expected for PG&E lines of similar designs and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed transmission lines would be designed to minimize the safety and nuisance impacts of specific concern to staff, staff does not recommend further mitigation and recommends approval of the proposed design and operational plan. If such approval were granted, staff would recommend that the Energy Commission adopt the conditions of certification specified below to ensure implementation of the measures necessary to achieve the field reduction and line safety specified by the applicant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed CGS transmission line according to the requirements of CPUC's GO-95; GO-52; GO-131D; Title 8, Section 2700 et seq. of the California Code of Regulations; and PG&E's EMF reduction guidelines arising from CPUC Decision 93-11-013 of 1989.

Verification: At least 30 days before starting construction of CGS's transmission line or related structures and facilities, the project owner shall submit to the Energy Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the line will be constructed according to the requirements GO-95; GO 52; GO-131D; Section 2700 et seq. of Title 8, California Code of Regulations; and PG&E's EMF-reduction guidelines arising from CPUC Decision 93-11-013.

TLSN-2 The project owner shall ensure that all metallic objects along the route of the CGS lines are grounded according to industry standards.

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.

TLSN-3 The project owner shall take reasonable steps to resolve any complaints of interference with radio or television signals from operation of the proposed lines.

Verification: Any reports of line-related complaints shall be summarized along with related mitigation measures for the first five years and provided in an annual report to the CPM.

TLSN-4 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields from the lines before and after they are energized. Measurements should be made at the representative points along the proposed route for which the applicant provide specific field strength estimates. 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.

REFERENCES

California Energy Commission. 1992. High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission publication P700-92-002. Sacramento, California.

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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.

VISUAL RESOURCES

William Kanemoto

SUMMARY

Sensitive receptors within the foreground and middleground project viewsheds were found to be few in number and the existing landscape setting is considered to be of moderate scenic quality. Consequently, moderate potential visual impacts of proposed project structures were found to be less than significant with recommended conditions of certification.

Due primarily to proposed use of air-cooling rather than wet-cooling, predicted visible plumes from the project were found by staff to fall below staff thresholds of potentially significant plume size and frequency. Thus, no significant adverse impacts are anticipated from visible vapor plumes.

INTRODUCTION

The following analysis evaluates potential visual impacts of the Colusa Generating Station project (CGS), its consistency with applicable LORS, and conformance with applicable guidelines of the California Environmental Quality Act (CEQA).

VISUAL ANALYSIS METHODOLOGY

The following discussion describes the methodology employed in the visual resource analysis of the proposed CGS. This methodology was developed by Energy Commission staff and applied on numerous previous power plant siting cases, and is fundamentally consistent with similar professionally accepted visual assessment techniques employed by various government agencies.

The project's visual setting is described in terms of existing visual character and quality. Visual character refers to formal attributes of the visual setting and is descriptive. Visual quality is an evaluative measure that reflects a judgment of a landscape's attractiveness as determined by characteristics broadly recognized as valued and preferred by most viewers. These include the presence of natural features, particularly vegetation and water, and visual attributes typically identified as preferred or valued in various professionally accepted assessment methodologies, such as vividness, distinctiveness, coherence, intactness, variety and interest. Visual quality is rated in the context of the project's broad regional landscape setting. That is, landscapes that are common within the region are assigned moderate visual quality. Landscapes that are unusually scenic and vivid within the region are given a high visual quality rating. The project setting was delineated into areas or landscape units of contiguous, broadly consistent visual character and quality. Generally, these correspond broadly with land uses as well as typical physiographic characteristics and are also referred to as image types.

Within each landscape unit, Key Observation Points (KOPs) are then identified to represent the most critical locations from which the project would be seen. These reflect, in particular, those key sensitive viewer groups most likely to be affected by the

project. Assessments of project impact are determined from these KOPs. KOPs are rated for their level of Visual Sensitivity to impact.

The visual characteristics of the project are then described. Typically, visual simulations of the project as seen from KOPs, accurately representing the perceived scale of the project from these locations, are required as described further below. These simulations along with field reconnaissance are used to evaluate the level of anticipated project contrast, dominance, and view blockage, leading to an overall impact rating from that KOP.

The Energy Commission staff's visual assessment methodology evaluates impact to a particular KOP in terms of two primary factors: sensitivity to impact of the KOP (attribute of the setting and viewers); and degree of visual change (an attribute of the project).

Visual Sensitivity captures those aspects of viewers and their setting that determine the likelihood of adverse impact. The fundamental elements of visual sensitivity include:

- ***viewer exposure*** – Visibility of a landscape feature, the number of viewers, distance, and the duration of the view are primary factors affecting viewer susceptibility to impacts.
- ***viewer concern*** – The level of viewer concern for visual change (viewer attitudes and expectations) is a key determinant of visual impact. It is often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern. Expressions of public policy with regard to visual resources are given great weight in determining viewer concern.
- ***visual quality*** – The evaluation of the existing visual quality of the setting.

Visual Sensitivity is rated on a scale of low to high. Thus, high visual quality, high viewer concern, and high viewer exposure to the project combine to create high sensitivity to impact.

Overall Visual Change captures the degree of *visual change* expected as a result of the project. The fundamental elements of visual change include:

- ***visual contrast –*** The conspicuousness or prominence of a project, and its compatibility with its setting, is primarily a function of its contrast with that setting. Contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting.
- ***project dominance –*** in the context of this methodology, dominance refers to the project's apparent size and scale within the field of view and in comparison to other objects in the field of view.
- ***view blockage/intrusion*** – blockage of existing scenic views is a criterion for determining significant visual impacts under the CEQA Guidelines. View blockage is assigned greater weight according to the quality and importance of the blocked view.

Visual change is rated on a scale of Negligible to Very Strong.

Visual change and visual sensitivity are then combined to arrive at preliminary findings of potential project impact significance.

In addition, the project is evaluated for conformance with applicable LORS. Adopted expressions of local public policy pertaining to visual resources are also given great weight in determining levels of viewer concern.

As needed, conditions of certification are proposed to reduce potentially significant impacts to less than significant levels, and to ensure LORS conformance, if feasible.

SIGNIFICANCE CRITERIA

The following regulatory criteria were considered in determining whether a visual impact would be significant.

State

The CEQA *Guidelines* define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance." (Cal. Code Regs., tit.14, § 15382.)

Appendix G of the *Guidelines*, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant.

a) Would the project have a substantial adverse effect on a scenic vista?

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Local

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Applicable Laws, Ordinances, Regulations, and Standards.

Professional Standards

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities. Staff considers these questions in assessing whether a project would cause a significant impact in regard to any of the four CEQA criteria listed above.

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?

- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?
- Will the project eliminate or block views of valuable visual resources?
- Will the project result in significant amounts of backscatter light into the
- nighttime sky?
- Will the project be in conflict with directly-identified public preferences regarding visual resources?
- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?
- Will the project result in a substantial visible exhaust plume?

Specifically, the process described above under the discussion of study methodology, that is, the combination of visual sensitivity and visual change, was used as a principal guideline in defining thresholds of impact significance.

Vapor Plume Impact Criteria

Visual impacts of vapor plumes are more difficult to evaluate than structures because they vary in both size and duration depending upon operating and meteorological conditions. Vapor plumes are generally associated in the public's mind with heavy industrial land uses and pollution, and thus tend to be regarded negatively by visually sensitive observers. Vapor plumes may attain very large size and thus affect considerably larger areas than a power plant's structures.

Impacts of visible plumes were evaluated on the basis of those plumes that would be expected to occur for 20 percent of seasonal daytime clear hours, during the 6-month period when plumes are most prevalent in the project setting. Nighttime hours without fog are also considered in cases where night illumination could result in potential visual impacts from plumes.

The 20 percent criterion recognizes that plumes occurring less frequently than 20 percent of the critical period would be sufficiently infrequent as to represent a less than significant impact regardless of size. The seasonal criterion reflects the tendency of visible plumes to be concentrated in certain seasonal periods and not in others. The clear criterion reflects the fact that plumes may often form in conditions that are also conducive to fog, rain and overcast weather, but are less likely to be highly visible or perceived as substantially adverse under such conditions, since visibility and contrast of plumes is lower under such conditions.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following discussion describes applicable laws, ordinances, regulations and standards. Project conformance with these standards is discussed in the Compliance with Applicable LORS section of Impacts, below.

FEDERAL

The project is not located on federal lands and thus would not be subject to federal land management regulations. Federal lands within the region, including Mendocino National Forest, the Snow Mountain Wilderness Area, and various Bureau of Land Management (BLM) lands, are outside the area of potential visual effect. Consequently, no federal LORS pertaining to visual resources would apply to the project.

STATE

State Scenic Highway Program

The California State Department of Transportation (Caltrans) identifies a state system of eligible and designated scenic highways which, if designated, are subject to various controls intended to preserve their scenic quality.

Within Colusa County, Highways 16 and 20 have been identified as State-eligible scenic highways (Caltrans, 2006; Colusa County, 1989). Site reconnaissance revealed that neither of these roadways lies within the project viewshed.

There are no eligible or State-designated scenic highways within Glenn County.

LOCAL

Colusa County General Plan

Circulation/Scenic Highways Element

In addition to State-eligible scenic highways (State Routes 16 and 20), the circulation element recommends several county roads, including the Maxwell-Stonyford Road, as local (County) scenic highways. The County has not formally adopted these recommendations.

Policies CIRC-41 through 50 describe a variety of land use restrictions and controls that apply within scenic highway corridors. However, staff field reconnaissance determined that the recommended County scenic roadway nearest to the project site, Maxwell-Stonyford Road, at a distance of over 5 miles, is located outside of the project's effective viewshed.

Figure CIRC-8 of the Circulation Element identifies Highway I-5 at the Glenn/Colusa County line as a County scenic gateway.

Open Space Element

Community Character Goals

'Protect the qualities that make the county distinct from other counties in California, and conserve the elements that contribute to a favorable quality of life.

Objectives: (a) To preserve the relaxed, pastoral atmosphere of Colusa County and its communities.'

Community Character Policies

Policy OS-13: 'Views of regional focal points, such as the Sutter Buttes, the Sacramento River, Snow Mountain, and St. John Mountain should be preserved wherever possible.

Policy OS-14: To the maximum extent possible, the significant open space resources in Colusa County, such as the foothills, Indian Valley, and Bear Valley, should remain visually undisturbed.'

Glenn County General Plan

Goal NRG-7: Preservation of aesthetic resources and values.

Policy NRP-86: Avoid light and glare impacts when considering development.

Policy NRP-87: Consider preparation of a scenic highways plan.

According to the Cultural Resources Background of the General Plan, State Highways 45 and 162 have been recommended for (local) scenic highway status. However, they have not been so adopted by the County at this time.

SETTING

REGIONAL LANDSCAPE SETTING

The proposed Colusa Generating Station is located on the western edge of the northern Sacramento Valley, at the base of foothills of the Coast Range. The Sacramento Valley portion of the project viewshed comprises a sparsely developed, open, level agricultural landscape offering largely unimpeded views to background distances to the north, east, and south of the project site. The valley landscape in this area is characterized by open grassland, rice fields, row crops, and occasional fruit and nut orchards that form expansive open views of broad, horizontal character, punctuated by occasional tall vertical forms of agricultural processing facilities and tall, localized ornamental tree plantings associated with older farmsteads. The intermittent, visually prominent vertical forms of agro-industrial processing plants are a characteristic feature of the Valley and Colusa County agricultural landscape. Peaks of the Sierra and the Sutter Buttes are also visible occasionally at the eastern horizon but are often obscured by haze, and are not otherwise prominent due to distance. The Sacramento and Delevan National Wildlife Refuges are located 5 miles or more from the project site to the east of I-5, as are recreational facilities along the Sacramento River, which parallels I-5 approximately 15 miles to the east of the project site.

West of the project site, views are enclosed by the Coast Range foothills, whose grass-covered slopes are devoid of tree or shrub cover and are undeveloped. Outstanding landscape features of the viewshed include Snow Mountain and other tall peaks of the Mendocino National Forest and Snow Mountain Wilderness Area, located approximately 30 miles directly west of the site, which can be seen rising behind the low rolling foreground foothills that descend near the site. In winter months, peaks of Snow Mountain, Goat Mountain, and St. John's Mountain are made more vivid by snow cover.

All identified sensitive viewpoints (KOPs) within the project viewshed are within the valley landscape unit. From these locations, the most prominent landscape features are the foothills and mountain peaks to the west, which together form a scenically intact, somewhat vivid and attractive backdrop to views in this general direction.

VISUAL RESOURCES Figure 1, Existing Landscape Setting and Key Observation Points, depicts landscape units in the project viewshed, and the location of KOPs. (All figures referred to in the text may be found at the end of this section.)

PROJECT SITE

The proposed CGS site is situated at the foot of the Coast Range foothills where these meet the level Sacramento Valley floor. The terrain is slightly rolling grassland. The Tehama-Colusa Canal runs north-south roughly 2,000 feet to the west and is not readily visible from viewpoints on the Valley floor. The project is also located roughly 3,000 feet west of the Glenn-Colusa Canal, which also runs north-south and is occasionally visible from public viewpoints, but is also little noticed due to the surrounding flat terrain and low elevation of potential viewpoints to the project site.

The site is adjacent to an existing PG&E natural gas compressor station and four 230 kilovolt (kV) transmission lines running north to south that comprise visually prominent features of industrial character in the immediate vicinity.

The site is currently grassland, devoid of trees or any other notable scenic features. Despite its apparently level topography when viewed from middle-ground distances of over ½ mile, the rolling project site actually varies approximately 41 feet in elevation from its highest to lowest points.

PROJECT AREA SETTING

Key Observation Points (KOPs):

The following discussion of the existing project landscape setting or *viewshed* characterizes identified KOPs in terms of their visual character and quality, viewer sensitivity, viewer exposure; and their combined overall Visual Sensitivity.

The *viewshed* or area of potential visual effect (the area within which the project could potentially be seen) is delineated in **VISUAL RESOURCES Figure 1**. As depicted in that figure, the viewshed extends to background distances (over five miles) to the north, east, and south. Views are contained immediately to the west by undeveloped foothills, which are largely devoid of recreational facilities, residences, or other potentially sensitive visual receptors within view of the project.

The following discussion subdivides the viewshed into landscape units, or areas of broadly uniform visual character and quality, to provide an overview of the existing setting. Visual character and quality as they affect potential impacts to specific KOPs are also discussed under each KOP.

KOP numbers from the AFC and subsequent Data Responses have been retained in the following discussion.

Landscape Unit 1 – Valley Agricultural Landscape

See **VISUAL RESOURCES Figure 1.** The project setting consists primarily of level agricultural land with grassland, row crops and other low-growing land cover that permits generally unimpeded views to great distances, dependent primarily upon atmospheric conditions. Views within the project viewshed are characterized by the broad horizontal lines of the valley floor, rolling foothills, and ridgelines of the Coast Range. Dominant colors vary seasonally from green grass-covered hills and brown agricultural fields during winter months, to brown grassy hills and green valley fields during warm seasons. This landscape includes scattered farms and rural residences that represent the principal potentially sensitive visual receptors in the viewshed. In addition, Highway I-5, whose numerous motorists also represent a principal sensitive viewer group, is located on the valley floor roughly 4 miles to the east of the project site at its nearest point.

In general, this landscape type, as found within the project viewshed, is of moderate scenic quality. It is largely intact (relatively undisturbed by prominent development), with moderately vivid features visible from outside the landscape unit itself, primarily Snow Mountain and adjoining tall mountain peaks to the west, and the Sutter Buttes in neighboring Sutter County to the southeast. Overall the landscape type is common throughout both the region and throughout the northern Central Valley. Within the viewshed there is an absence of features with unusual vividness, such as prominent water bodies, unique vistas, etc. that would constitute a distinctive, clearly high level of scenic quality.

KOPs 1 through 4, all located within Unit 1, are all very similar to one another, representing views of rural residents, local motorists, and workers at foreground (up to 0.5 mile) and middle-ground (from 0.5 to 3 - 5 miles) distances to the project. KOP 5, also within landscape Unit 1, represents the view of motorists on Highway I-5 to the east.

KOP 1 - View Looking Northwest from McDermott Road, 2-3/4 Miles from Site

KOP 1 depicts a typical view from middle-ground distance on McDermott Road, south of Delevan Road and approximately 2-3/4 miles from the project site. It is representative of views by motorists on McDermott Road, and by residents on scattered farms along McDermott Road and elsewhere in the viewshed at similar distances (**VISUAL RESOURCES Figure 3A**).

Visual Quality – Visual quality is *moderate*. Visual intactness is moderate to high. Intactness is somewhat compromised by the presence of the PG&E compressor station and adjacent 230 kV transmission lines, which at this distance, present noticeable features of an industrial character that contrast in form, line, color and texture with the foothill and mountain backdrop, but remain visually subordinate due to their small overall magnitude within the field of view. Though attractive, the landscape is typical of those seen from the western portions of the northern San Joaquin Valley as seen from I-5. The view includes moderately vivid features, most prominently Snow Mountain and adjacent high peaks in views to the west and southwest.

Viewer Concern – Viewer concern is *high* on the part of residents in the rural homes in this portion of the viewshed. Concern of motorists would be *moderate*, and of workers, *low*.

Viewer Exposure –Visibility in this setting is *high*. The flat valley terrain and lack of tall land cover leaves most views uninterrupted to great distances to the north, east, and south of the project site. KOP 1 is located at middleground distance of under three miles from the project site. Duration of view is relatively high for residents, low for motorists.

The number of sensitive viewers located within the middle-ground viewshed is low. Approximately a dozen homes are located within a 3-mile middle-ground radius of the project site, within which viewers are most susceptible to visual impact (E&L2006a, p., p.8.4-2). Beyond that distance, susceptibility to impacts from project structures would be low due to distance, though impacts due to visible vapor plumes could occur depending upon the size and frequency of such plumes. Overall viewer exposure, due to the limited overall number of viewers, is thus moderate.

Overall visual sensitivity of this KOP is considered *Moderate*.

KOP 2 - View from Nearest Residence, 1-1/2 Miles Southeast of Site

KOP 2 depicts the view from the nearest residence, located approximately 1.5 miles to the southeast of the project site (**VISUAL RESOURCES Figure 4A**).

Visual Quality – Visual quality is *moderate*, as discussed above. At this distance the intactness of views toward the site is noticeably compromised by the existing PG&E compressor station and adjacent existing 230 kV transmission lines. Views of the Snow Mountain Wilderness are vivid and dramatic, particularly in clear winter weather when peaks are snow-capped, but are not unique to this location and are similar to views seen in various parts of both the project viewshed and the surrounding portions of the Central Valley.

Viewer Concern – Concern of the residents would be considered *high*. Concern of motorists in general is considered *moderate*, and of workers, *low*.

Viewer Exposure – Visibility throughout the Valley landscape type is high. The number of sensitive viewers here and within the middleground viewshed of the project generally, however, is low. The distance zone is middleground. View duration for residents is high, for motorists, low. Overall, visual exposure is *moderate*.

Overall visual sensitivity of this KOP is therefore *Moderate*.

KOP 3 - View from McDermott Road, 2 Miles Northeast of Site

KOP 3 is very similar to KOP 1, depicting a typical view at middle-ground distance from McDermott Road, in this case somewhat to the north of the project site at a distance of approximately 2 miles. Like KOP 1, it is representative of views by motorists on McDermott Road, and of views from scattered farms along McDermott Road and elsewhere in the viewshed at similar distances (**VISUAL RESOURCES Figure 5A**)

Visual Quality – Visual quality is *moderate*, as described above.

Viewer Concern – Viewer concern is *high* for residents in the rural homes in this portion of the viewshed. Viewer concern of motorists is *moderate*, and of workers, *low*.

Viewer Exposure – As discussed previously, visibility throughout the Valley landscape type is *high*. The number of sensitive viewers within the middleground viewshed of the project is *low*. View duration for residents is *high*, for motorists, *low*. Viewer distance is middleground. Overall, visual exposure is *moderate*.

Overall visual sensitivity of this KOP is therefore considered *Moderate*.

KOP 4 View South from Ranch on Road 69, 2-1/4 Miles Northeast of Site

KOP 4 depicts the view from the nearest residence directly north of the project site, at a distance of approximately 2 miles. It is representative of a very small number of residents on Road 69 (**VISUAL RESOURCES Figure 6A**).

Visual Quality – Visual quality is *moderate*. Visual intactness is somewhat higher from this location because the existing compressor station appears less prominent at this angle of view than from the other KOPs. Vividness of views in the direction of the project site, however, is lower from this KOP than from the others because the site is seen in a different direction (south) than the vivid mountain peaks, which appear far to the west from this location, outside of the project field of view.

Viewer Concern – Viewer concern is *high* on the part of residents. Motorists on Road 69 are extremely few. Viewer concern of workers on this road is *low*.

Viewer Exposure – As discussed previously, visibility throughout the Valley landscape type is *high*. This KOP is located at middleground distance. View duration for residents is high. Number of viewers however is *low:* only one home on Road 69 would be affected. Due to the single affected viewer in this segment of the viewshed, overall exposure is low.

Considering the moderate visual quality, high viewer concern of residents, and low visual exposure, overall visual sensitivity of this KOP is therefore considered *Low to Moderate*.

KOP 5 View Looking West from County Line on I-5, 4-1/2 Miles Northeast of Site

KOP 5 depicts the view toward the project site from I-5 at the Glenn/Colusa County line. This viewpoint is identified in the Colusa County General Plan (Figure CIRC-8) as a County scenic gateway, and represents the most sensitive viewer condition in the vicinity as seen from I-5 (**VISUAL RESOURCES Figure 7A**)(Colusa County, 1989).

Visual Quality - Visual quality is *moderate* as described above.

Viewer Concern –The number of motorists for whom this view is representative is very high. On the other hand, the level of viewers' scenic expectation in this area, which is not a notable scenic area or recreational destination itself, is generally moderate. Due to the status of this location as an identified County scenic gateway, however, viewer concern was considered *moderate to high* overall.

Viewer Exposure –Visibility in this setting is *high*. The flat valley terrain and lack of tall or extensive land cover of substantial height leaves views to the project site open and uninterrupted. Viewer number is also *high*, taking into account the large number of motorists entering Colusa County from the north on I-5 each day. Duration of views by such motorists within far-middleground to background distances of up to 5 miles is relatively *low*, lasting somewhat less than 1 minute at 60 mph. Visual magnitude of the project at this background distance, however, is very *low*. Overall exposure is *moderate*.

Overall visual sensitivity of this KOP, taking into consideration the special designation of I-5 at the County Line as a County scenic gateway, is *Moderate to High.*

Landscape Unit 2 – Foothills and Coast Range

As described previously, this portion of the viewshed consists primarily of undeveloped, low elevation grassy slopes of the Coast Range foothills, at the point where they descend onto the Sacramento Valley floor in the vicinity of the proposed project site. Farther west, taller forested hills and peaks of the Snow Mountain Wilderness Area located within the Mendocino National Forest (MNF) may be seen rising above the foreground foothill ridgeline (refer to **VISUAL RESOURCES Figure 4A**). This landscape type contributes prominently to the character of the project viewshed, accounting for most of the vivid qualities present within the viewshed at large.

The Snow Mountain Wilderness Area and other areas of the MNF are located roughly 30 miles west of the project site. At this distance they are not regarded as potential receptors of the project. Primary access routes to these recreational destinations to the west, such as Maxwell-Colusa Road, located over 6 miles south of the project site, are located well outside of the project viewshed

Peaks of the Coast Range, including Snow Mountain, Goat Mountain, and others represent the primary designated visual focal points located within the County as described in the County General Plan (Figure CIRC-8, Bicycle Routes and Scenic Highways of Colusa County) (Colusa County 1989).

No KOPs were identified within this portion of the project viewshed due to the absence of any recreational facilities, residences, or other potentially sensitive receptors from which the project might be visible.

Other Landscape Types in the Region

Other significant landscape types within the region include the Sacramento River corridor, and the Sierra Nevada Range, to the east. Both of these are located well outside the project viewshed and neither would strongly influence nor be affected by the proposed project. Rural and urbanized residential communities are found in Colusa and Glenn counties but these all lay outside the project viewshed.

IMPACTS

As described previously under Visual Analysis Methodology, visual impacts are assessed as a function of Visual Sensitivity (viewer and setting attributes) and Visual Change (anticipated degree of visual change due to the project).

Ratings of existing and proposed project contrast, dominance, and view blockage were made on the basis of field observation, photo documentation, and study of applicant- and staff-prepared visual simulations and other project information. The applicant's KOP views reproduced in the AFC were reviewed and duplicated by staff in the field, to confirm the accurate reproduction of visual scale of the simulations when viewed at normal reading distance in tabloid-sized (11" x 17") format in the AFC.

KOP numbers from the AFC have been retained to minimize confusion. However, the order in which they are discussed has been changed to accord with the structure of this analysis.

VISUAL PROJECT DESCRIPTION

Power Plant

VISUAL RESOURCES Figures 2A and **2B** depict architectural elevations of the proposed power plant.

As depicted in the applicant's architectural elevations, the proposed units would have a top-of-HRSG elevation of approximately 87.5 feet, and a top-of-stack elevation of 175 feet. The proposed air-cooled condensor unit would be 144 feet tall with a footprint of approximately 220 feet x 365 feet. Other visually prominent features would include a single-story control room/administration building, water storage tanks, and a roughly 600-foot x 550-foot (8.2 acres) switchyard. Exhaust stacks would be 19 feet in diameter (E&L2006a).

Plant Night Lighting

According to the AFC, lighting would be directionally oriented, shielded and hooded to minimize offsite migration of light (E&L2006a). No other detail is provided.

Other Project Features

Teresa Creek Bridge Replacement

A 75-foot clear span or prefabricated bridge would replace the existing wood deck Teresa Creek Bridge on McDermott Road, located roughly 2 miles east of the project site between Dirks Road and Delevan Road.

Other Roadway improvements

A new 30-foot-wide, approximately 2,500-foot-long asphalt access road would be constructed extending from the existing PG&E road easement, running south of the PG&E compressor station site and accessing the project site from the southeast corner.

The intersection of Delevan and McDermott roads would be widened by grading and placement of gravel to accommodate wide turning radius of construction trucks.

Construction Staging Area

Approximately 43 acres of the northern portion of the project site would be used as a lay-down and parking area for construction of the power plant and switchyard.

Linear Facilities

Transmission Lines

Eight double circuit 230 kV transmission lines, four to the north and four to the south, would connect the proposed switchyard on the northern portion of the project site to the four existing PG&E transmission lines, located approximately 1,800 feet east of the site. Approximately 12 new double-circuit, steel lattice transmission towers of approximately 100- to 125-foot height would be constructed between the project switchyard and the existing power lines. Each of the eight lines would be roughly 1,800 feet in length. The towers would be similar in type and scale to the existing PG&E towers in the adjoining transmission corridor.

Water lines

A 4-inch, 2,700-foot water supply pipeline would be constructed between the power plant site and the Tehama-Colusa Canal, located west of the project boundary.

Gas Lines

An approximately 1,500-foot long gas line would be constructed from the power plant to existing PG&E natural gas lines.

VISUAL IMPACT ASSESSMENT

Direct Impacts

Potential direct impacts of the proposed project are addressed below under the four significance criteria of the CEQA Guidelines Appendix G. A summary of the visual impact analysis is presented in a table in **VISUAL RESOURCES Appendix B.**

Would the project have a substantial adverse effect on a scenic vista?

Potential project impacts to scenic vistas are not analyzed separately in the AFC. Potential project impacts on scenic westward views are discussed in relation to KOP 4. That discussion dismisses potential impacts on scenic westward views (primarily of Snow Mountain) based on the (southward) view orientation of KOP 4 to the project site, away from the scenic view corridors. While valid with respect to KOP 4, this argument does not address the fact that the same scenic features (Snow Mountain and Coast Range peaks) are visible from all KOPs, some within the same immediate field of view as the project.

Scenic features visible within the project viewshed include taller peaks of the Snow Mountain Wilderness Area west of the project site and, to a lesser degree, the Sutter Buttes to the southeast of the site, which are occasionally visible from the project vicinity under clear atmospheric conditions, but are visually subordinate from the project viewshed even under ideal visibility conditions.

The full analysis of visual effects to individual KOPs is presented in detail further below, in the discussion of Visual Character or Quality. The following summarizes the results of these analyses for the specific KOPs relevant to the discussion of scenic vistas.

The project would be visible in the general foreground of scenic views of Snow Mountain and other tall peaks of the Coast Range, from viewpoints generally within the quadrant to the east of the site. This quadrant encompasses most of the potential project receptors within the middle-ground distance zone of 5 miles. KOP 2 is most representative of this condition among the key viewpoints identified for analysis (refer to **VISUAL RESOURCES Figure 4B**). To a lesser degree, KOP 5 represents this condition at far-middleground distances. From outside of this sector of the viewshed, the scenic taller mountain peaks might be visible but these views would be little affected by the project.

Project structures, including power plant, substation, and new transmission towers, would not directly block or intrude into views of the scenic tall peaks in these views. As depicted in **VISUAL RESOURCES Figure 4B**, the exhaust stacks and other taller plant features would not sky-line nearby foothill ridgelines which form the visual foreground of such views, and thus do not directly intrude into views of mountain peaks. The structures would, however, compete to a degree with those mountains for viewers' attention within the same general field of view. These existing views toward the mountains are currently compromised to a weak-to-moderate degree by the existing natural gas compressor facilities adjacent to the proposed power plant. The overall visual change to KOP 2 due to contrast and competing visual dominance of project structures would be moderate to strong, as discussed further, below. In the context of the moderate sensitivity of the landscape setting from this KOP, this impact would be potentially significant without mitigation. With staff-recommended mitigation measures, however, this level of visual intrusion into scenic views would be reduced to a less than significant level. Predicted worst-case seasonal project vapor plumes would not extend above (skyline) the distant mountain ridgeline. They could intrude into views of Snow Mountain from this and other viewpoints directly east of the site (though not from any of the other selected KOPs). However, as discussed in detail below, the frequency of such plumes would fall below staff thresholds of significance. In the context of the moderate sensitivity of the landscape setting, this impact would be less than significant.

KOP 5, located at I-5 approximately 4-1/2 miles from the project site, is representative of background views in the sector east of the project site within which views toward scenic tall peaks might be affected. This location has been identified as a County scenic gateway in the Colusa County General Plan (Figure CIRC-8) (Colusa County, 1989). At these distances, project structures would be visually very subordinate and represent a weak overall level of visual change (refer to **VISUAL RESOURCES Figure 7B**). In the context of the moderate to high sensitivity of the landscape setting from I-5, this level of change would be less than significant.

Predicted seasonal project vapor plumes could occasionally intrude on views of Snow Mountain and other peaks of the Coast Range from certain similar I-5 viewpoints directly east of the site, though they would not skyline the distant ridgeline. In the worst instances these could appear co-dominant with the scenic mountain peaks in the same field of view. However, the frequency of visible plumes of any size would be low, falling below staff thresholds of significance.

The project would thus not have substantial adverse effects on scenic vistas, with staff-recommended mitigation measures described below.

Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The AFC identifies no high or moderate quality natural features on or near the project site, and therefore finds no direct impacts to (on-site) scenic resources as a result of the project. Staff concurs with this conclusion of the AFC with respect to effects to on-site scenic resources.

As indicated in the previous discussion of LORS, there are no state-designated or eligible scenic highways within the proposed project viewshed. Furthermore, no notable scenic resources such as trees, rock outcroppings, or historic buildings were observed on or near the project site. Although the foothills are identified as a significant open space resource in the Colusa County General Plan (Policy OS-14), the project would be located in the valley floor and would not affect the foothills (Colusa county, 1989) Thus, the project would not damage any scenic resources.

Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Potential project impacts on the visual character and quality of the setting are discussed in the following under Project Operation Impacts and Construction Impacts. Project operation impacts are discussed by KOP, below.

Project Operation Impacts

In discussions of simulations or respective KOPs, readers should note that representations are of the unmitigated project, except where specific measures have been proposed by the applicant.

Visible Vapor Plume Impacts

The proposed project would be air-cooled. Therefore the wet-cooling towers that are typically responsible for the largest and most frequent visible plumes from power plant projects would not be a part of this project. Visible plumes from the project's exhaust stacks could occur, though at much lower magnitudes and frequencies than from wet-cooling systems.

The AFC presented a visible vapor plume modeling and analysis, using the Combustion Stack Visible Plume (CSVP) computer model. The applicant's modeling assumed a worst-case scenario of full load peak duct firing at all times. Under this assumption, the applicant's modeling identified potential visible plumes for 33 percent of the critical impact period, defined by Energy Commission staff as seasonal (in this case, November through April) daylight clear hours. Following Energy Commission staff criteria, analysis of potential plume impacts is based on the 20^{th} percentile plume for that critical period. The applicant's modeling identified that plume as 610 feet in length; 571 feet in height; with a maximum plume depth of 184 feet.

Staff conducted similar computer modeling of predicted visible vapor plumes, also using the CSVP model (refer to **VISUAL RESOURCES Appendix A** for staff's complete modeling analysis). However, staff concluded that the assumption of full duct firing in the AFC modeling was not reasonable or realistic. Staff based its independent modeling

on the 'more reasonable but still conservative assumption . . . (of) 50 percent or 12 hours per day of duct firing operation,' assumed to occur between 9 a.m. and 9 p.m. based on PG&E historic demand data. Based on these altered assumptions, staff's modeling predicted visible vapor plumes for only 15.6 percent of seasonal daylight clear hours, less than half the frequency predicted by the AFC. Because staff's predicted visible plume frequency falls below the staff threshold of 20 percent of seasonal daylight clear hours, those visible plumes would, by staff's definition, be less than significant. For predicted overall plume frequencies below the 20 percent threshold, plume dimensions are thus not calculated, since by definition they are not within the range of concern.

Nighttime plumes would also be anticipated, although their frequency was not modeled either by the Applicant or staff. With sufficient up-lighting, nighttime plumes could, if frequent enough, potentially represent an adverse impact, particularly to nearby residences. However, such up-lighting from the project itself would be prohibited under staff-recommended Condition of Certification **VIS-2**, and no other substantial night lighting exists in the vicinity.

Thus, adverse impacts from visible nighttime plumes are not anticipated, assuming implementation of Condition **VIS-2**.

Impacts of Structures on Key Observation Points

As stated previously, staff concurred with the AFC selection of KOPs for the analysis of potential project impacts, and therefore has also used these in the staff assessment for simplicity.

Staff does not concur with many of the specific evaluations and rationales underlying the AFC's conclusions on potential impacts to each of the KOPs, as presented in Section 8.11.2.3.2, or Tables 8.11-3 and 8.11-4 (E&L2006a). However, based on staff's own independent application of the staff's visual impact assessment methodology, staff's final conclusions regarding potential impact to each of the KOPs were largely very similar to those of the AFC, with exceptions noted below. That is, staff concluded that potential adverse impacts of proposed facility structures would be less than significant from all key observation points, but only with recommended conditions of certification, as detailed below.

Staff notes that the visual simulations in the AFC somewhat exaggerate the likely effectiveness of project contrast reduction through color treatment. In reality the level of contrast reduction shown is seldom attainable, due to changing light conditions, shadowing and changing seasonal background colors. Nevertheless, staff does concur that color treatment can reduce project impacts. The simulations in the AFC depict contrast-reducing color treatment of the air-cooling unit, but not of other ancillary project facilities. The following analysis reflects this condition.

KOP 1 – Looking Northwest from McDermott Road, 2-3/4 Miles from Site. **VISUAL RESOURCES Figures 3A** and **3B.**

Visual Contrast –The project structures would introduce features with vertical and rectilinear form and line, and characteristically industrial textures that contrast to a moderate degree with their backdrop of broad horizontal ridgelines, rolling foothills, and

largely unspoiled natural land-cover. In addition to the strong form contrast of the large, taller facility features, notably the air-cooling unit and HRSG stacks, other lower ancillary facility structures and features would create a visually cluttered industrial image contributing further to form, texture and color contrast. From middle-ground valley viewpoints such as this, the structures would not sky-line ridges, thus leaving intact the predominant horizontal lines of the existing natural landscape and moderating potential form and line contrast. Contrast with the adjacent existing compressor station would be weak due to the similarity of form, line and texture of the two facilities. Non-reflective tan and/or green painting of the air-cooling unit would reduce potential overall contrast substantially. From KOP 1 the project would be seen behind the existing PG&E compressor station, which already exhibits vertical and rectilinear form and line contrast with the natural terrain, and strong color contrast that draws the observer's eye.

Overall, visual contrast of the project structures at this distance (2-3/4 miles) would be moderate.

Visual Dominance – With paint color mitigation of the air-cooling unit and portions of the HRSG units as depicted in the AFC, project structures from this KOP would be visually co-dominant with other existing middle-ground features in the view, but subordinate to Snow Mountain, which visually dominates in a direction away from the project site (dominant spatial and scale dominance).

View Blockage – The project would not sky-line above background ridgelines, and would therefore not intrude into views of the scenic higher peaks of the Coast Range to the west. View blockage would represent minor blockage of a moderate quality view, and would be weak overall.

Overall Visual Change – Due to the moderate level of contrast, subordinate visual dominance, and weak view blockage, overall visual change due to structures, with applicant- proposed painting mitigation, would be moderate.

Impact Significance – Combined with the setting's moderate visual sensitivity, the overall moderate level of project visual change would represent a somewhat adverse but less than significant visual impact.

Mitigation

Reduction of structure color contrast would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of *all* project structures to ensure the lowest feasible color contrast in the short term.

In addition, screening of the facility's visual clutter with perimeter landscape plantings would further reduce project texture, color and form contrast in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, perimeter landscape screening. This condition of certification would also improve the project's conformance with local scenic goals and objectives as discussed below under the discussion of compliance with applicable LORS.

Residual Impact Significance After Mitigation with Staff-Recommended Measures

Non-reflective tan and/or green painting of *all* facility structures would reduce overall contrast further in the short term, muting the visual clutter of ancillary project structures. Perimeter landscape screening would further reduce facility contrast in the long term by eventual screening of ancillary facility structures. With staff-recommended measures, overall visual change due to the project would be moderate in the short term, and low to moderate in the long term, representing a less than significant impact in both the short and long term.

KOP 2 – View from Nearest Residence, 1-1/2 Miles Southeast of Site. **VISUAL RESOURCES Figures 4A** and **4B**.

Visual Contrast – The contrast of vertical and rectilinear form and line and of industrial textures against the natural landscape would be moderated somewhat by the adjacent, existing PG&E compressor station and transmission lines, which exhibit a similar industrial visual character, and are located in the visual foreground of the project site. Overall however, with paint color mitigation of the air-cooling unit and portions of the HRSG units as depicted in the AFC, visual contrast of the project structures with the setting (including both the natural landscape features and existing structures) at this distance (1-1/2 miles) would remain moderate to strong.

Visual Dominance – Visual dominance of project structures from this KOP would be co-dominant within the overall view. From this viewpoint the project would appear as a visually contiguous extension of the existing compressor station, of greater visual magnitude than the existing facility, but with comparable conspicuousness due to substantially lower color contrast. The project would appear spatially co-dominant with Snow Mountain, competing with views of peaks for the viewer's attention.
View Blockage – Overall view blockage would be weak. The project would not sky-line above background ridgelines from this viewpoint, and would not intrude directly into views of the more dramatic Coast Range peaks. It would represent a minor blockage of a moderate quality view.

Overall Visual Change – Due to the moderate to strong contrast, visual co- dominance, and weak view blockage, overall visual change due to structures would be moderate to strong.

Impact Significance – Combined with the moderate visual sensitivity of the KOP, the overall moderate to strong level of visual change could result in a potentially significant visual impact.

Mitigation

Reduction of color contrast of *all* project structures would be an important factor in reducing overall project contrast and dominance from this KOP. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term.

In addition, screening of the facility's visual clutter with perimeter landscape plantings would further reduce project texture, color and form contrast in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, perimeter landscape screening. This condition of certification would also improve the project's conformance

with local scenic goals and objectives as discussed below under the discussion of compliance with applicable LORS.

Residual Impact Significance *After Mitigation with Staff-Recommended Measures*

Non-reflective tan and/or green painting of *all* facility structures would reduce overall contrast further in the short term, muting the visual clutter of ancillary project structures. Perimeter landscape screening would further reduce facility contrast in the long term by eventual screening of ancillary facility structures. With these staff-recommended measures, overall visual change due to the project would be moderate in the short term, and low to moderate in the long term, representing a less than significant impact in both the short and long term.

KOP 3 – View from McDermott Road, 2 Miles Northeast of Site. **VISUAL RESOURCES Figures 5A** and **5B**.

Visual Contrast – The project structures would introduce features with vertical and rectilinear form and line, and characteristically industrial textures that contrast moderately with their backdrop of broad horizontal ridgelines and rolling foothills. The structures would not sky-line background ridgelines. Contrast with the adjacent existing compressor station would be weak due to the substantial similarity of form, line and texture of the two facilities. Overall however, with paint color mitigation of the air-cooling unit and portions of the HRSG units as depicted in the AFC, visual contrast of the project structures with the setting (including both the natural landscape features and existing structures) at this distance (2 miles) would remain moderate to strong.

Visual Dominance – From KOP 3, the project would not appear visually contiguous with the nearby compressor station, but would be located in the same general direction of view, thus increasing the portion of the view with industrial character. As depicted in the AFC, project structures from this KOP would be visually co-dominant due to the relative absence of development other than the compressor station, and the absence of other dominant scenic features such as Snow Mountain within views toward the site.

View Blockage – Overall view blockage would be weak. Views to Snow Mountain and other tall peaks are located to the west, away from the project, in views from this quadrant of the viewshed. The project would intrude into views of nearby rolling foothills, but would not sky-line above their ridgelines from this viewpoint. It would represent a minor blockage of a moderate quality view.

Overall Visual Change – Due to the moderate to strong contrast, visual co- dominance, and weak view blockage, overall level of visual change due to structures would thus be moderate to strong.

Impact Significance – Combined with the setting's moderate visual sensitivity, the overall moderate to strong level of visual change result in a potentially significant visual impact.

Mitigation

Reduction of color contrast of *all* project structures would be an important factor in reducing overall project contrast and dominance from this KOP. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term.

In addition, screening of the facility's visual clutter with perimeter landscape plantings would further reduce project texture, color and form contrast in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, perimeter landscape screening. This condition of certification would also improve the project's conformance with local scenic goals and objectives as discussed below under the discussion of compliance with applicable LORS.

Residual Impact Significance After Mitigation with Staff-Recommended Measures

Non-reflective tan and/or green painting of ***all*** facility structures would reduce overall contrast further in the short term, muting the visual clutter of ancillary project structures. Perimeter landscape screening would further reduce facility contrast in the long term by eventual screening of ancillary facility structures. With these staff-recommended measures, overall visual change due to the project would be moderate in the short term, and low to moderate in the long term, representing a less than significant impact in both the short and long term.

KOP 4 – View South from Ranch on Road 69. **VISUAL RESOURCES Figures 6A** and **6B**.

Visual Contrast – The project would present contrast of vertical and rectilinear form and line and of industrial textures against the natural landscape.
From this specific KOP, portions of the project HRSG stacks and air-cooling unit would sky-line above the background Coast Range ridgeline, accentuating form and line contrast. Overall, visual contrast of the project structures with their setting (including the natural landscape and existing features) at this distance (approximately 2-1/4 miles) would be moderate to strong.

Visual Dominance – Visual dominance of project structures from this KOP would be co-dominant. As seen from this location the project is separated in space from the existing compressor station, and would appear relatively more prominent. At this distance, visual magnitude of the facility would be relatively low. However, the facility would appear of comparable dominance to other existing features of the view, including prominent background ridgelines and existing transmission towers.

View Blockage – Overall view blockage would be weak. Outstanding scenic features in this location (mountain peaks) are located to the west, in a different quadrant of the view, and would thus be unaffected by the project. The project would intrude into views of nearby rolling foothills, but would, however, sky-line above their ridgelines from this viewpoint, accentuating both contrast and dominance. It would represent a moderate blockage of a moderate quality view.

Overall Visual Change – Due to the moderate to strong contrast, visual co-dominance, and weak view blockage, overall level of visual change due to structures would thus be moderate to strong.

Impact Significance – Combined with low to moderate visual sensitivity of this KOP, the overall moderate to strong level of visual change would be considered adverse but less than significant.

Mitigation

Reduction of color contrast of *all* project structures would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, painting of all project structures to ensure the lowest feasible color contrast in the short term.

In addition, screening of the facility's visual clutter with perimeter landscape plantings would further reduce project texture, color and form contrast in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, perimeter landscape screening. This condition of certification would also improve the project's conformance with local scenic goals and objectives as discussed below under the discussion of compliance with applicable LORS.

Residual Impact Significance After Mitigation with Staff-Recommended Measures

Non-reflective tan and/or green painting of ***all*** facility structures would reduce overall contrast further in the short term, muting the visual clutter of ancillary project structures. Perimeter landscape screening would further reduce facility contrast in the long term by eventual screening of ancillary facility structures. With these staff-recommended measures, overall visual change due to the project would be moderate in the short term, and low to moderate in the long term, representing a less than significant impact in both the short and long term.

KOP 5 – View Looking West from County Line on I-5. **VISUAL RESOURCES Figures 7A** and **7B**.

Visual Contrast – Overall, visual contrast of the project structures at this distance (approximately 4-1/2 miles) would be weak, particularly with paint color mitigation of the air-cooling unit and portions of the HRSG units as depicted in the AFC at this distance project features are indistinct and relatively inconspicuous, and form and line contrast resulting from vertical project features are minor and weak. Also at this distance, contrast between the existing compressor facility and proposed power plant structures would be negligible.

Visual Dominance – Similarly, visual dominance of project structures from this KOP would be very subordinate. At this distance the project would occupy a very small portion of the field of view and would not sky-line above background ridgelines, thus attracting little attention.

View Blockage – Overall view blockage would be negligible.

Overall Visual Change – Due to weak contrast, weak dominance, and negligible view blockage, overall visual change due to structures would thus be low.

Impact Significance – Combined with the moderate to high visual sensitivity of the setting from this KOP, the overall low level of impact would be somewhat adverse, but less than significant.

Mitigation

Mitigation measures would not be needed for potential impacts from this KOP and similar viewpoints on Highway I-5.

Overall Project Operation Impacts on Existing Visual Character or Quality

Project operations could potentially result in significant impacts on residences within a near-middle-ground radius of roughly 2 miles, without staff-recommended mitigation measures.

However, project operation impacts from all identified KOPs, both individually and cumulatively, would be less than significant with applicant- and staff-recommended color mitigation (Condition of Certification **VIS-1**), staff-recommended lighting mitigation (Condition of Certification **VIS-2**, discussed below), and staff-recommended perimeter landscape screening (Condition of Certification **VIS-3**). With these measures, the impacts from project operation would not substantially degrade the existing visual character or quality of the site and its surroundings, as perceived by sensitive receptors in the project viewshed, in either the short or long term.

Project Construction Impacts

The AFC does not provide an explanation or rationale for why construction-related impacts would, as is stated, be less than significant. However, staff ultimately concurs with that finding, as follows:

On-Site Construction Activities

Even from worst-case viewpoints such as KOP 2 and Delevan Road (approximately one mile east of the project site), on-site construction activities, with fugitive dust-control measures as proposed by the applicant in the AFC (E&L2006a, p.3-22), would exhibit weak visual contrast and dominance, negligible view blockage, and would cause less than significant impacts. In addition such effects would be temporary, though these are expected to last 24 months (E&L2006a, p.3-18).

Bridge Construction

Reconstruction of the Teresa Creek Bridge on McDermott Road would have minor, temporary visual effects. The number of affected viewers would be low, and the level of these viewers' visual sensitivity would be moderate to low due to the work-related activities of the great majority of such viewers. These impacts would be insignificant.

Access Road Construction

New access road construction would result in minor visual effects from visible grading, presence of construction equipment, and occasional creation of dust. Road construction

west of Delevan Road would be seen at a distance of 2,000 feet or more. At that distance the activities would have limited visibility and have weak to negligible effects, assuming full implementation of applicant-proposed dust control measures. The direct effects of road construction would thus not affect motorists or residents visually to any substantial degree, would be relatively short-term in duration, and would have insignificant impacts. Widening of the intersection of Delevan Road and McDermott Road would be noticeable by workers and passing residents but would be minor and of short duration. This impact would also be insignificant.

Gas and Water Line Construction

Trenching for construction of proposed gas and water lines would create very minor temporary visual contrast as seen from public viewpoints. These visible ground disturbances would be expected to recover through natural re-establishment of grass cover. This impact would be insignificant.

Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The AFC addresses potential light and glare impacts in relation to KOP 1 only, at a distance of 2.7 miles from the project site. The AFC finds such impacts to be less than significant based on various lighting design features which, however, staff was unable to identify elsewhere in the AFC either as proposed project features or mitigation measures. Further, staff is concerned that night lighting impacts could potentially affect all foreground and middle-ground residential viewpoints.

Adverse light impacts could potentially occur from bright facility night lighting, particularly as seen from nearby residences within a middle-ground distance zone. In addition, the project viewshed is highly susceptible to 'light pollution' impacts (nighttime 'backscatter' or uplighting impacts), due to the very dark existing ambient light levels of this undeveloped, rural area. There is currently no street lighting, little development of any kind, and no other substantial industrial development other than the adjoining PG&E compressor station.

Residents are considered to have high sensitivity to night lighting impacts. Typical bright industrial lighting could result in a highly dominant, strongly contrasting element in the nighttime landscape with incompatible character within the existing rural setting. Under worst-case conditions with bright, industrial lighting left on throughout the night, significant adverse impacts could be anticipated on at least those residents nearest the project site. Without appropriate mitigation, such worst-case lighting could also result in significant light pollution impacts to the project viewshed, altering the nighttime setting with noticeably higher ambient light levels within a near-middle-ground radius.

As described under staff-recommended Condition of Certification **VIS-2**, plant and parking area lighting would be of minimal brightness consistent with safety; would be shielded and directed to eliminate all direct off-site illumination and all upward (backscatter) illumination; and lighting for maintenance purposes would be kept off when not needed. With these measures, the facility would impart a somewhat industrial character to the night-time viewshed of the approximately one dozen residences within near-middle-ground distance (3 miles) of the project site. With adoption of this staff-

recommended measure, the night-time level of anticipated visual change would be weak, resulting in impacts to residences that would range from less-than-significant to insignificant.

With staff recommended Condition of Certification **VIS-1**, major facility components would be painted in non-reflective paint, eliminating potential sources of day-time reflective solar glare that could otherwise occur on shiny metallic surfaces.

Indirect Impacts

No anticipated indirect visual impacts were identified.

Cumulative Impacts

The proposed power plant would combine with the adjacent, existing PG&E compressor station and nearby existing transmission towers to increase the industrial visual character of the existing setting. Though the combined effect of the two facilities taken together is additively greater than either taken alone, their cumulative impact would not, in this case, exceed a new and higher threshold of impact than the direct effects of the project or existing compressor individually. For example, from KOP 2 the overall visual dominance – that is, the degree to which the proposed project features would demand and dominate viewers' attention - was considered to be moderate. The level of contrast and dominance would be moderate with or without the presence of the existing compressor structures, even though the combined effect would be incrementally higher.

One reasonably foreseeable future cumulative project was identified in the project viewshed, an 18-unit residential subdivision near Maxwell, roughly 5 miles from the project site (E&L2006a, p.8.4-4). At this background distance, the projects would have negligible visual effects on one another, and the potential interaction of the two projects within one viewshed would be relatively minor. Furthermore, most future projects with the potential to contribute to significant cumulative visual impacts – for example, additional power plants or other large industrial facilities – would, like the proposed project, require a General Plan Amendment. Although project-created visible plumes could theoretically interact with any existing plumes to create cumulative impacts, no such plume sources within the project viewshed were identified. Thus, no adverse cumulative visual impacts from the project are anticipated.

The minority population in the project study area falls below a threshold of 50 percent, so there are no environmental justice issues for this case. Furthermore, staff has not identified any unmitigated direct, indirect, or cumulative impacts.

COMPLIANCE WITH APPLICABLE LORS

FEDERAL

The project is not located on federal lands and thus would not be subject to federal land management regulations. The nearest federal lands, including the Mendocino National Forest, Snow Mountain Wilderness Area, and BLM lands in the region, all lie outside of the project viewshed and would not be affected by project visual effects, including those

of visible plumes. Consequently, no federal LORS pertaining to visual resources would apply to the project.

STATE

State Scenic Highway Program

Within Colusa County, State Highways 16 and 20 have been identified as eligible scenic highways. Due to their substantial distance from the project, neither of these roads lies within the area of potential project visual effect. Thus no adverse impacts to these roadways are anticipated and the project would thus comply with this LORS.

There are no eligible or State-designated scenic highways within Glenn County.

LOCAL

Colusa County General Plan

The Colusa County General Plan recognizes the value of preserving the rural character of the community for its residents:

Open Space Element

Community Character Goals and Objectives

Goal: Protect the qualities that make the county distinct from other counties in California, and conserve the elements that contribute to a favorable quality of life.

Objectives: (a) To preserve the relaxed, pastoral atmosphere of Colusa County and its communities.

Discussion: The highly industrial character of the CGS facility would detract from the existing rural character of the setting as experienced by the residences within middle-ground distance of the project. Although the absolute number of these residents is small, their sensitivity to visual change is expected to be high. This increase in industrial character could be perceived as inconsistent with the goal of preserving the existing rural character for residents.

Consequently, staff recommends adoption of Condition of Certification **VIS-3**, consisting of trees planted on a portion of the project's eastern, southern, and northern boundaries as appropriate, sufficient to partially screen ancillary project features in views from nearby public roads and residences. Both tree hedgerows and informal tree groupings are typical features of the valley agricultural landscape. Although the recommended tree screening could not screen the tallest project features, it would help to reduce the loss of rural character by screening visually cluttered views of the various lower, ancillary project features in the long term.

With this measure, the project would comply with the intent of these objectives and goals of the General Plan.

Community Character Policies

Policy OS-13: Views of regional focal points, such as the Sutter Buttes, the Sacramento River, Snow Mountain, and St. John Mountain should be preserved wherever possible.

Discussion: The project is not anticipated to intrude substantially upon sensitive views of Snow and St. John mountains or other identified regional focal points. Visible project vapor plumes could occasionally intrude upon views of these mountains from various identified KOPs within the viewshed, but for a very low proportion of the time. This level of potential view intrusion is minor. The project would thus be consistent with this policy.

Policy OS-14: To the maximum extent possible, the significant open space resources in Colusa County, such as the foothills, Indian Valley, and Bear Valley, should remain visually undisturbed.

Discussion: Indian Valley and Bear Valley would remain unaffected by the proposed project. Views to the foothills, which are located adjacent to the project site, would be affected to varying degrees from the various KOPs as discussed previously. With staff-recommended Condition of Certification **VIS-1** as discussed above, this degree of intrusion into views of the foothills would be mitigated to a visually subordinate level that would substantially conform to this policy.

Circulation/Scenic Highways

The County General Plan recognizes the importance of maintaining the quality of views from scenic highways in order to preserve the community's rural character. The Circulation Element states that "land in scenic highway corridors is to be used in a way that is harmonious with the corridor's natural character."

The General Plan Circulation Element recommends several County roads, including the Maxwell-Stonyford Road, as local (County) scenic highways.

Figure CIRC-8 of the Circulation Element identifies Highway I-5 at the Glenn/Colusa County line as a County scenic gateway.

Discussion: Maxwell-Stonyford Road, the nearest recommended County scenic road, located approximately 6 miles south of the project, is well outside of the area of potential project visual effect and would not be adversely affected by the project. The project would thus be consistent with County policies and recommendations regarding scenic roads. Identification of I-5 at the Glenn/Colusa county line as a scenic gateway does not imply any explicit policies or other requirements. However, it does indicate a higher level of viewer sensitivity, which has been incorporated in the staff analysis of potential impacts from this viewpoint (KOP 5).

Glenn County General Plan

Goal NRG-7: Calls for '(p)reservation of aesthetic resources and values.'
Policy NRP-86: 'Avoid light and glare impacts when considering development.'

Discussion: With recommended Condition of Certification **VIS-2**, anticipated project glare and night lighting impacts would be insignificant. The project would thus be consistent with this policy.

Policy NRP-87: 'Consider preparation of a scenic highways plan.' The County has not yet adopted this plan.

Discussion: According to the Cultural Resources Background of the Glenn County General Plan, State Highways 45 and 162 have been recommended for (local) scenic highway status. Both Highways 45 and 162 are well outside of the project viewshed due to distance and would thus be unaffected by the project. The project would thus be consistent with this policy.

CONCLUSIONS AND RECOMMENDATIONS

Because sensitive receptors within the foreground and middleground project viewsheds are few in number, and because the existing landscape setting is considered to be of moderate scenic quality, the anticipated levels of visual change from all KOPs would result in less-than-significant visual impacts with incorporation of staff-recommended Conditions of Certification **VIS-1, VIS-2**, and **VIS-3**. Condition **VIS-3** would also achieve conformance with Colusa County Community Character Goals and Objectives.

Due primarily to proposed use of air-cooling rather than wet-cooling, predicted visible plumes of the CGS would be from exhaust stacks only, and were found by staff to fall below staff thresholds of potential adverse impact. Thus, no significant impacts are anticipated from visible vapor plumes.

The Energy Commission should adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

Surface Treatment of Project Structures and Buildings

VIS-1 The project owner shall treat the surfaces of all project structures and buildings 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 non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

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) A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

b) A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

c) One set of color brochures or color chips showing each proposed color and finish;

d) One set of 11" x 17" color photo simulations at life size scale, of the treatment proposed for use on project structures, including structures treated during manufacture, from Key Observation Points 2 and 5 (locations shown on Visual Resources Figure 1 of the Staff Assessment);

e) A specific schedule for completion of the treatment; and

f) A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 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 [specify local jurisdiction] for review and comment.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any 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.

Permanent Exterior Lighting

VIS-2 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 [specify local agency] 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; and

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 [specify local agency] 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.

Perimeter Landscape Screening

VIS-3 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 along the southern, eastern, and northern facility boundaries as appropriate, of sufficient density and height to screen the power plant structures to the greatest feasible extent within the shortest feasible time.

The project owner shall submit to the CPM for review and approval and simultaneously to Colusa County for review and comment a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

a) A detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction.

b) A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

c) Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project;

d) A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project; and

e) One set of 11”x17” color photo-simulations of the proposed landscaping at five years and twenty years after planting, as viewed from Key Observation Points 2 and 5 (locations shown on Visual Resources Figure 1 of the Staff Assessment).

The plan shall not be implemented until the project owner receives final approval from the CPM.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to [local agency] for review and comment at least 90 days prior to installation.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to Colusa County a revised plan for review and approval by the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and [specify local agency] within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

REFERENCES

Caltrans (California Department of Transportation), 2006. Scenic Highway Master Plan.

Colusa County, 1989. Colusa County General Plan.

E&L2006a. Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

Glenn County, 1993. Glenn County General Plan.

Smardon, R. and J. Palmer, J. Felleman, 1986. Foundations of Visual Project Analysis.

VISIBLE PLUME MODELING ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Colusa Generating Station (CGS) gas turbine heat recovery steam generator (HRSG) exhaust stack visible plumes. Staff completed a modeling analysis for the applicant's proposed unabated gas turbine/HRSG design.

PROJECT DESCRIPTION

The applicant has proposed two 7F frame gas turbine/HRSGs with duct burners. The proposed project will employ an air cooled condenser for project cooling and also will employ a small auxiliary boiler[1]. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhausts.

VISIBLE PLUME MODELING METHODS

PLUME FREQUENCY MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate plume frequency and plume dimensions for the HRSG exhausts. This model provides conservative estimates of both plume frequency and plume size. This model uses hourly 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) that determine mixing at the plume centerline. Wind speeds are set to 1 meter per second (m/s) during calm hours and a rural land classification was used in the modeling analysis.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20 percent of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. The methodology used to determine high visual contrast hours is provided below:

> 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

[1] The auxiliary boiler due to: 1) its small size (44 MMbtu/hr), which at less than 1/50th the heat input of the duct firing case for the gas turbine/HRSGs; 2) its exhaust characteristics as outlined in Appendix G3 of the AFC (E&L2006a); and 3) its limited operating schedule should not create significantly frequent or large visible plumes.

meteorological data set[2] used provides sky cover and in the analysis categorizes total sky cover as “clear”, “scattered”, “broken”, “overcast”, “partially obscured”, and obscured”. For the purpose of estimating the high visual contrast hours staff has included in the “Clear” category a) all hours with total sky cover defined as “clear” plus b) half of the non-obscured scattered and broken hours. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and b) for a substantial portion of the time when total sky cover is not clear or obscured the opacity of the sky cover is relatively low (equal to or less than 50%), and these clouds do not substantially reduce contrast with plumes. Staff has estimated that approximately half of the hours with sky opacity of less than 50% can be considered high visual contrast hours and are included in the “clear” sky definition.

If it is determined that the seasonal daylight clear hour plume frequency is greater than 20 percent then plume dimensions are calculated, and a significance analysis of the plumes is included in the Visual Resources section of the Staff Assessment.

HRSG VISIBLE PLUME MODELING ANALYSIS

HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the Applicant, the frequency of visible plumes can be estimated. The operating data for these stacks, used to model the potential visible plume frequency, are provided in Visible Plume Table 1.

Visible Plume Table 1 – HRSG Exhaust Parameters [a]

Parameter	**HRSG Exhaust Parameters**			
Stack Height	140 feet (42.672 meters)			
Stack Diameter	19.0 feet (5.79 meters)			
Ambient Conditions	Molecular Weight	Moisture Content (% by weight)	Exhaust Flow Rate (klb/hr)	Exhaust Temp (°F)
Full Load No Duct Firing				
18 °F	28.47	4.76	3,866.0	193
59 °F	28.39	5.24	3,583.0	193
114 °F	28.21	6.32	3,388.0	202
Full Load Peak Duct Firing				
18 °F	28.31	6.34	3,895.9	162
59 °F	28.22	6.93	3,612.9	161
114 °F	28.03	8.14	3,418.5	186

Source: AFC (E&L2006a, Appendix G7 and modeling files on CD)

Note: a. Values were extrapolated or interpolated between hourly ambient condition data points, using applicant provided exhaust temperature relationship for duct firing conditions above 59°F as T = 0.5352 x T(ambient) + 129 (URS2007b, Data Response 112).

[2] This analysis uses a five year (2001 through 2005) meteorological data set provided by the applicant. This meteorological data is based on the most local and complete met data for the site area, which is represented by data from both Maxwell and Red Bluff, CA.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a five-year meteorological data set provided by the applicant that combined ambient conditions from Maxwell with general weather and cloud cover conditions from Red Bluff. Visible Plume Table 2 provides the CSVP model visible plume frequency results for duct firing and no duct firing operations as determined by the staff and also provides, in parenthesis, the duct firing operations visible plume prediction determined by the applicant (E&L2006a, Appendix G7).

Visible Plume Table 2 – Predicted Hours with HRSG Steam Plumes
Maxwell/Red Bluff 2001-2005 Meteorological Data

Case	Modeled Hours	Full Load No Duct Firing		Full Load Peak Duct Firing	
		Plume (hr)	Percent	Plume (hr)	Percent
All Hours	43,824	1,506	3.4%	15,931 (15,234)	36.4% (34.8%)
Daylight Hours	22,254	377	1.7%	5,012 (4,746)	22.5% (21.3%)
Daylight No Rain No Fog	19,815	199	1.0%	3,225 (3,017)	16.3% (15.2%)
Seasonal Daylight No Rain No Fog*	7,808	198	2.5%	2,687 (2,578)	34.4% (33.0%)
Seasonal Daylight Clear**	6,148	154	2.5%	1,811 (1,733)	29.5% (28.2%)

Applicant modeling results shown in parenthesis (), and the applicant only modeled the peak duct firing case. The applicant modeling results were revised by staff to conform to staff's determination of which hours are seasonal daylight clear hours.
*Seasonal conditions occur anytime from November through April.
**Available hours based on seasonal daylight clear hours.

Visible plumes are predicted to occur very infrequently when operating under full load no duct firing. The predicted visible plume frequencies increase significantly when operating with peak duct firing. Staff's results and the applicant's modeling results for peak duct firing are very similar, but are still somewhat different due to using different methods to interpolate the stack exhaust conditions between the ambient temperatures given in Visible Plume Table 1. If the facility were to only operate at full duct firing load then the plume frequency would be predicted to occur greater than 20 percent of seasonal daylight clear hours. However, it is not reasonable to assume operation at this level year round. A more reasonable, but still conservative, assumption would be to use the operating profile established in the air quality calculations that use an assumption essentially equivalent to 50%, or 12 hours per day, of duct firing operation. A review of PG&E seasonal demand loads indicates that a duct firing operating schedule of 9 am to 9 pm would be the most reasonable assumption consistent with daily 50% duct firing operation. Visible Plume Table 3 provides the predicted visible plume frequencies for this mixed duct firing/no duct firing operating schedule.

Visible Plume Table 3 – Predicted Hours with HRSG Steam Plumes
9 am to 9 pm Duct Firing, 9 pm to 9 am No Duct Firing
Maxwell/Red Bluff 2001-2005 Meteorological Data

Case	Modeled Hours		
		Plume (hr)	Percent
All Hours	43,824	6,203	14.2%
Daylight Hours	22,254	2,813	12.6%
Daylight No Rain No Fog	19,815	1,560	7.9%
Seasonal Daylight No Rain No Fog*	7,808	1,517	19.4%
Seasonal Daylight Clear**	6,148	958	15.6%

*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 is used as a plume impact study threshold trigger. The visible plume frequencies are predicted to occur less than 20 percent of seasonal daylight clear hours for a reasonable worst case operation of duct firing occurring from 9 am to 9 pm daily and full load no duct firing occurring from 9 pm to 9 am.

CONCLUSIONS

Visible water vapor plumes from the proposed Colusa Generating Station turbine/HRSG exhausts will occur occasionally, particularly when duct firing during the colder months. However, considering a reasonable worst-case operating schedule/profile the turbine/HRSG visible plumes are predicted to occur below 20 percent of seasonal daylight clear hours. Because the frequency would be below 20 percent expected visible plume dimensions have not been modeled.

No visible water vapor plumes will be emitted from the air cooled condenser, and visible plumes of significant frequency and size are not expected to be emitted from the small auxiliary boiler.

REFERENCES

E&L2006a - E&L, LLC / A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

URS2007b - URS/D. Shileikis (tn: 39247). Data Responses to data requests, Submitted to CEC/ Docket Unit on 2/13/2007.

VISUAL RESOURCES APPENDIX B

Visual VR-B Summary of Analysis

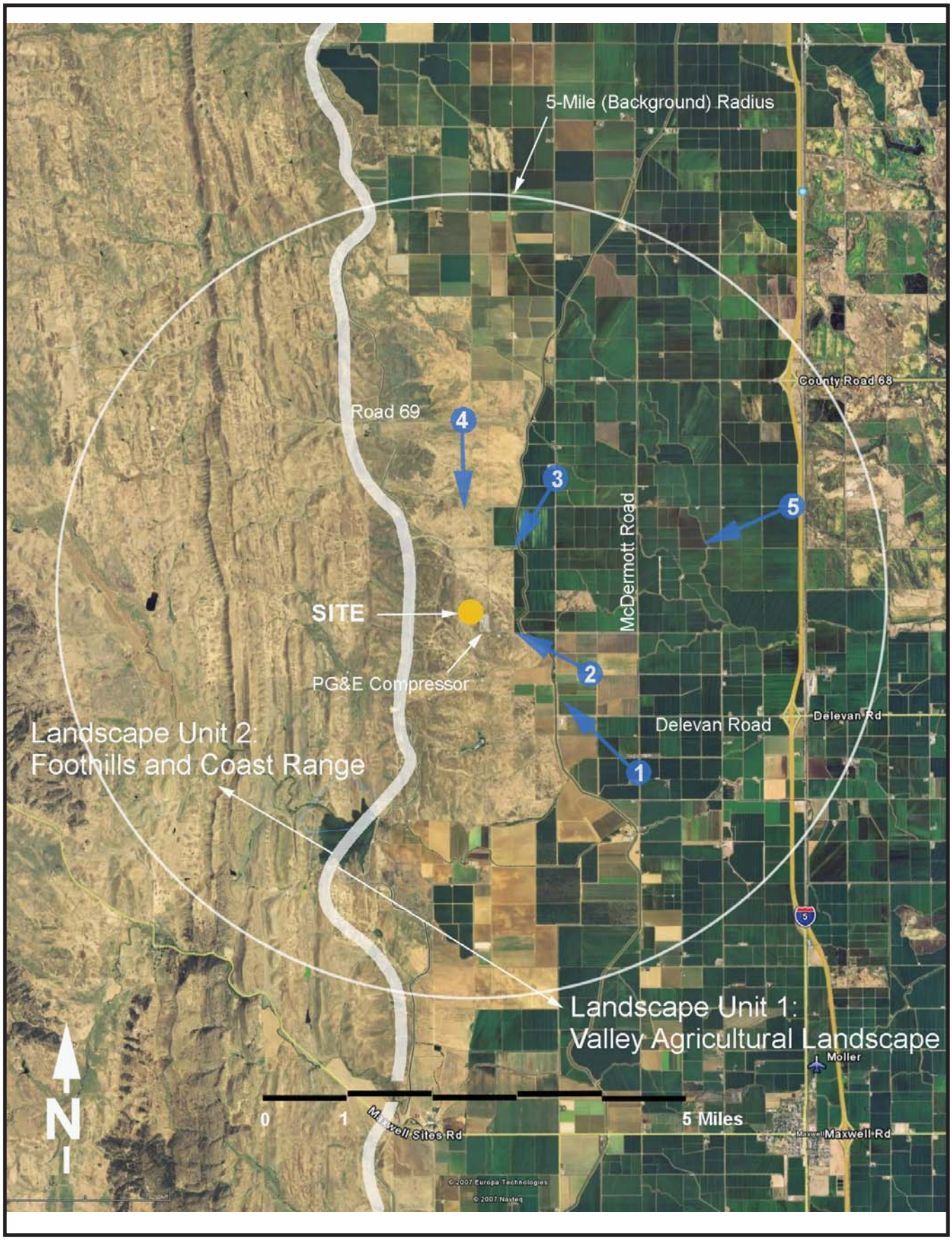
APPENDIX VR – B
COLUSA GENERATING STATION STAFF ASSESSMENT - VISUAL RESOURCES SUMMARY OF ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING								VISUAL CHANGE					IMPACT SIGNIFICANCE		
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure					Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change[1]	Impact Significance w/o Mitigation	Mitigation	Impact Significance with Mitigation
				Visibility	Distance Zone	Number of Viewers	Duration of View	Overall Viewer Exposure									
KOP 1 **View from McDermott Road** **VR Figure 3a, 3b**	View to the northwest from McDermott Road approximately 2-3/4 miles from the project site.	**Moderate**	Residents**: High** Motorists: Moderate Wokers: Low	**High**	**Middleground**	**Low**	**Residents and workers: High Motorists: Moderate**	**Moderate**	**Moderate**	STRUCTURES: Project would cause moderate line, and texture contrast with setting, which is mitigated by similar, adjacent industrial features of existing gas compressor structures. Color and form contrast would be strong without mitigation. The project would occupy a small proportion of the field of view. The project would not skyline against ridgelines in visual background.	**Moderate**	**Scale Dominance: Co-Dominant** **Spatial Dominance: Subordinate**	**Minor blockage of moderate quality view (Weak blockage)**	**Moderate**	**Less than significant**	**VIS-1** **VIS-2** **VIS-3**	**Less Than Significant**
										PLUMES:				**Below 20% seasonal daylight clear criterion**			**Less Than Significant**
KOP 2 **View from Nearest Residence** **VR Figure 4a, 4b**	View to the northwest from nearest residence, roughly 1-1/2 miles from project site.	**Moderate**	Residents**: High** Motorists: Moderate **Wokers: Low**	**High**	**Middleground**	**Low**	**Residents and workers: High Motorists: Moderate**	**Moderate**	**Moderate**	STRUCTURES: Project would cause moderate to strong form and line contrast, moderate contrast of texture with setting, mitigated by similar, adjacent industrial features of existing gas compressor structures. Color and form contrast would be strong without mitigation. The project would occupy a small proportion of the field of view. The project would not skyline against ridgelines in visual background.	**Moderate to Strong**	**Scale Dominance: Co-Dominant** **Spatial Dominance: Co-Dominant**	**Minor blockage of moderate quality view (Weak blockage)**	Moderate to Strong	**Potentially significant**	**VIS-1** **VIS-2** **VIS-3**	**Less Than Significant**
										PLUMES:				**Below 20% seasonal daylight clear criterion**			**Less Than Significant**
KOP 3 **View from McDermott Road** **VR Figure 5a, 5b**	View to the southwest from McDermott Road approximately 2 miles from the project site	**Moderate**	Residents**: High** Motorists: Moderate **Wokers: Low**	**High**	**Middleground**	**Low**	**Residents and workers: High Motorists: Moderate**	**Moderate**	**Moderate**	STRUCTURES: Project would cause moderate form, line and texture contrast with setting, mitigated by similar, adjacent industrial features of existing gas compressor structures. Color and form contrast would be strong without mitigation. The project would occupy a small proportion of the field of view. The project would not skyline against ridgelines in visual background.	**Moderate to Strong**	**Scale Dominance: Co-dominant** **Spatial Dominance: Subordinate**	**Minor blockage of moderate quality view (Weak blockage)**	**Moderate to Strong**	**Potentially significant**	**VIS-1** **VIS-2** **VIS-3**	**Less Than Significant**
										PLUMES:				**Below 20% seasonal daylight clear criterion**			**Less Than Significant**

APPENDIX VR – B
COLUSA GENERATING STATION STAFF ASSESSMENT - VISUAL RESOURCES SUMMARY OF ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING								VISUAL CHANGE					IMPACT SIGNIFICANCE		
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure					Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change[1]	Impact Significance w/o Mitigation	Mitigation	Impact Significance with Mitigation
				Visibility	Distance Zone	Number of Viewers	Duration of View	Overall Viewer Exposure									
KOP 4 **View from Ranch on Road 69** **VR Figure 6a, 6b**	View to south from Road 69, approximately 2 miles from site.	**Moderate**	Residents**: High** **No non-resident motorists anticipated** **Wokers: Low**	**High**	**Middleground**	**Low**	**Residents and workers: High**	**Low**	**Low to Moderate**	STRUCTURES: Project would cause moderately high form and line contrast, moderate contrast of texture with setting, which is mitigated by similar, adjacent industrial features of existing gas compressor structures. Color and form contrast would be strong without mitigation. The project would occupy a small proportion of the field of view. The project could skyline against ridgelines in visual background.	**Moderate to Strong**	**Scale Dominance: Co-dominant** **Spatial Dominance: Subordinate**	**Minor blockage of moderate quality view (Weak blockage)**	**Moderate to Strong**	**Less than significant**	**VIS-1** **VIS-2** **VIS-3**	**Less Than Significant**
										PLUMES:				**Below 20% seasonal daylight clear criterion**			**Less Than Significant**
KOP 5 **Hiighway I-5 at Glenn-ColusaCounty LIne** **VR Figure 7a, 7b**	View to west from I-5 at county Line, approximately 5 miles from site	**Moderate**	Motorists: Moderate to High	**High**	**Background**	**High**	**Low**	**Moderate**	**Moderate to High**	STRUCTURES: Project would cause weak form and line contrast, weak contrast of texture with setting. Color and form contrast would be weak without mitigation. The project would occupy a minute proportion of the field of view. The project would not skyline against ridgelines in visual background.	**Weak**	**Scale Dominance: Subordinate** **Spatial Dominance: Subordinate**	**Negligible blockage**	**Low**	**Less than significant**	**VIS-1** **VIS-2** **VIS-3**	**Insignificant**
										PLUMES:				**Below 20% seasonal daylight clear criterion**			**Less Than Significant**

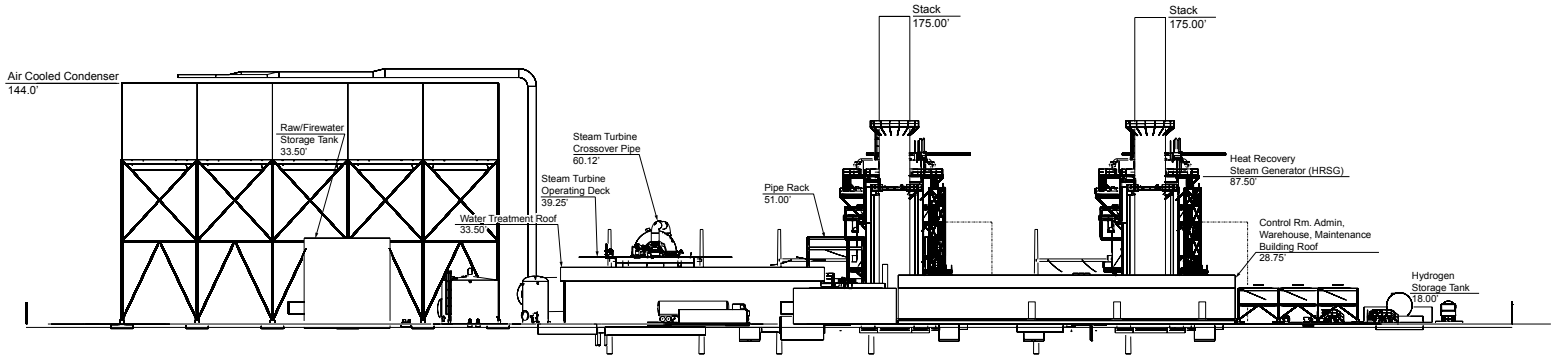
VISUAL RESOURCES - FIGURE 1
Colusa Generating Station - Existing Landscape Setting and Key Observation Points

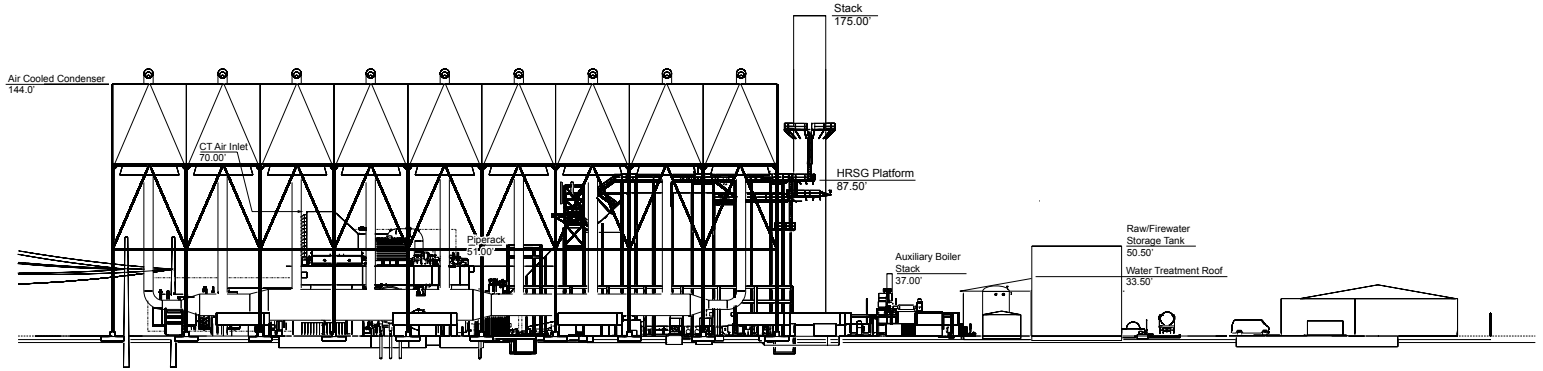


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007
SOURCE: Google Earth

VISUAL RESOURCES - FIGURE 2

Colusa Generating Station - Proposed Project: Architectural Elevations





CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 3.4-2, 3.4-3

VISUAL RESOURCES - FIGURE 3a

Colusa Generating Station - KOP #1 - Existing View Looking Northwest from McDermott Road

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-2

VISUAL RESOURCES - FIGURE 3b

Colusa Generating Station - KOP #1 - Simulated View

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-3

VISUAL RESOURCES - FIGURE 4a

Colusa Generating Station - KOP #2 - Existing View Looking Northwest from Nearest Road

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-4

VISUAL RESOURCES - FIGURE 4b

Colusa Generating Station - KOP #2 - Simulated View

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-5

VISUAL RESOURCES - FIGURE 5a

Colusa Generating Station - KOP #3 - Existing View Looking Southwest From McDermott Road

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-6

VISUAL RESOURCES - FIGURE 5b

Colusa Generating Station - KOP #3 - Simulated View

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-7

VISUAL RESOURCES - FIGURE 6a

Colusa Generating Station - KOP #4 - Existing View Looking South from Road 69

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-8

VISUAL RESOURCES - FIGURE 6b

Colusa Generating Station - KOP #4 - Simulated View

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-9

VISUAL RESOURCES - FIGURE 7a

Colusa Generating Station - KOP #5 - Existing View Looking West from Highway I-5 at County Line

JULY 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-10

VISUAL RESOURCES - FIGURE 7b

Colusa Generating Station - KOP #5 - Simulated View

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, JULY 2007

SOURCE: AFC Figure 8.11-11

WASTE MANAGEMENT

Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the Colusa Generating Station (CGS) would not result in any significant adverse impacts if the measures and remediation proposed in the Application for Certification (AFC) and staff's proposed conditions of certification are implemented.

INTRODUCTION

This section analyzes issues associated with managing wastes generated from constructing and operating the proposed Colusa Generating Station and with managing any hazardous wastes already existing on site because of past activities. Staff has evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. Staff also evaluated the potential for site remediation. The technical scope of this analysis encompasses solid wastes existing on site and those generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- the management of the wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- the disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- upon project completion, the site is managed so that contaminants would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following framework of federal, state, and local environmental laws, ordinances, regulations, and standards exists to ensure the safe and proper management of hazardous waste from generation to disposal to reduce the risks of accidents that might impact worker and public health and the environment. The provisions of these LORS have established the basis for staff's determination regarding the significance and acceptability of the CGS project 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 §6922—Resource Conservation and Recovery Act (RCRA)	Establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding: • recordkeeping practices which identify quantities of hazardous wastes generated and their disposition, • labeling practices and use of appropriate containers, • use of a manifest system for transportation, and • submission of periodic reports to the U.S. Environmental Protection Agency (EPA) or authorized state agency.
RCRA Subtitle C	Controls storage, treatment, and disposal of hazardous waste.
RCRA Subtitle D	Regulates design and operation of solid waste landfills.
RCRA 3008(h)	The corrective action program designed to ensure the remediation of hazardous releases and contamination associated with RCRA-regulated facilities.
Title 40, Code of Federal Regulations, part 260	Regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.
State	
California Health and Safety Code §25100 et seq.—Hazardous Waste Control Act of 1972, as amended	Creates the framework under which hazardous wastes must be managed in California. This act mandates that the State Department of Health Services (now the Department of Toxic Substances Control [DTSC])under the California Environmental Protection Agency (Cal/EPA) develop and publish a list of hazardous and extremely hazardous wastes and develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal/EPA and creates a manifest system to be used when transporting such wastes.
Title 14, California Code of Regulations §17200 et seq. (minimum standards for solid waste handling and disposal)	Set forth minimum standards for solid waste handling and disposal and guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.
Title 22, California Code of Regulations §66262.10 et seq. (generator standards)	Establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established and are enforced by the Cal/EPA Department of Toxic Substances Control.
Title 22, California	Establish reporting requirements for generators of certain hazardous and

Code of Regulations §67100.1 et seq. (hazardous waste source reduction and management review)	extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.
The Asbestos Airborne Toxic Control Measure (ATCM)	Adopted by the California Air Resources Board (California ARB) for construction, grading, quarrying, and surface mining operations. The ATCM requires specific mitigation measures to prevent off-site migration of asbestos-containing dust.
Title 8, California Code of Regulations §§1529 and 5208	Require the proper removal of asbestos-containing materials. These regulations are enforced by California Occupational Safety and Health Administration (Cal/OSHA).
Local	
Colusa County Code	Controls storage, treatment, and disposal of hazardous waste.

SETTING

The proposed CGS power plant and switchyard will use approximately 31 acres of the 100-acre site (E&LW, 2006a §8.13.1). The project site is located in an agricultural area on the Holthouse Ranch property near Maxwell in Colusa County, California. The property consists of uncultivated agricultural land that is used for grazing (E&LW, 2006a Appendix N).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This **WASTE MANAGEMENT** section addresses two issues: 1) potential existing site contamination and 2) the methods used to handle wastes, including Class I hazardous wastes, Class II designated wastes, and Class III municipal solid wastes, during construction and operations. The methods staff uses and the thresholds for determining significance of impacts are different for these two issues.

For any site proposed for the construction of a power plant in California, the applicant must provide sufficient documentation about the nature of any existing contamination on the site. Staff requires a Phase I Environmental Site Assessment (ESA) be prepared and submitted to the Energy Commission for staff's review and evaluation. A Phase I ESA provides a history of use of the site, often as far back as the mid-1800s, and a list of any hazardous waste release within a certain distance of the site. If there is reasonable potential that the site contains hazardous waste, soil or ground water would be sampled and analyzed as part of a Phase II ESA. The Phase II ESA verifies the level of contamination and the potential for remediation.

Staff utilizes a two-step approach for determining if hazardous waste present on the site would pose a risk to on-site workers (construction or operations) or the public. The first

step applies standards promulgated by Cal/EPA, principally by the Department of Toxic Substances Control (DTSC), the Office of Environmental Health Hazard Assessment (OEHHA), and the Regional Water Quality Control Boards. Staff compares the levels of contaminants found on site with established standards, such as OEHHA California Human Health Screening Levels (CHHSLs). If metals are suspected of being present at unsafe levels, staff compares those levels to levels that occur naturally in soil or water as tabulated by DTSC or other federal agencies.

The second step involves the preparation of a site-specific Human Health Risk Assessment and/or Ecological Risk Assessment. The human health risk assessment would follow Cal/EPA guidelines and must address all affected populations including the most burdened and compromised receptors. Staff would require the applicant to prepare such an assessment and would require some form of remediation if the human health cancer risk exceeded one in one million or the non-cancer hazard index exceeded 1.0, per Title 42, USC Section 6922 (Resource Conservation and Recovery Act), and per the California Health and Safety Code Section 25100 et seq. (Hazardous Waste Control Act of 1972, as amended). An ecological risk screening evaluation or risk assessment would be required if contaminants might pose a risk to biological receptors. The applicant also would follow Cal/EPA and Regional Water Quality Control Board guidelines, and if the ecological risks were significant, appropriate mitigation would be required.

Regarding the management of wastes generated during construction and operation, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods meet the state standards for waste reduction and recycling. Staff then reviews the available off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the allotted daily, yearly, or lifetime volume of waste the disposal site is allowed to receive. Staff uses a threshold of less than 10 percent impact on a waste disposal facility to determine if the impact would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Contamination

The entire 100-acre project site is currently used for grazing; no rice or row crop fields are present or adjacent to the project site (E&LW, 2006a, p. 8.9-2). The Phase I ESA of the proposed project dated May 24, 2006, was prepared in accordance with ASTM practice E 1527-00 (E&LW, 2006a Appendix N). The historical photographs, in the Phase I ESA for 1937, 1964, 1975, 1987, and 1998, show undeveloped agricultural land. The Phase I ESA did not identify any Recognized Environmental Conditions (REC) on the Colusa site, thereby eliminating the need for a Phase II ESA. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release into the ground, ground water or surface water of the property.

Construction Impacts and Mitigation

Site preparation and construction of the proposed generating plant and associated facilities would last approximately 24 months and would generate both nonhazardous

and hazardous wastes in solid and liquid forms (E&LW, 2006a §1.6). Before construction can begin, the project owner would be required to develop and implement a Construction Waste Management Plan per proposed Condition of Certification **Waste-5**.

Fifty tons of metal debris from welding/cutting activities, packing materials, electrical wiring, and empty nonhazardous chemical containers would be generated during construction. Nonhazardous solid wastes generated during construction also include up to 4,160 cubic yards of wood, paper, cardboard, glass, plastic, insulation, concrete waste lumber, packing material, insulation, and empty containers. (E&LW, 2006a §8.13.2.1.1). All nonhazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility, per Title 14, California Code of Regulations Section 17200 et seq.

Nonhazardous liquid wastes would be generated during construction and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with a Drainage, Erosion, and Sediment Control Plan that would be prepared for the project and approved prior to construction. Other wastewaters would be sampled to determine their disposal.

Since excavation activities and trenching during construction of the proposed project may encounter potentially contaminated soils, specific handling, disposal, and other precautions may be necessary per Title 22, California Code of Regulations Section 66262.10. Staff concludes that proposed Conditions of Certification **Waste-1** and **Waste-2** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with Title 22, California Code of Regulations Section 66262.10.

Hazardous wastes that may be generated during construction include hazardous material containers, spent batteries, waste oil, transmission fluid, hydraulic fluid, waste paint, oil absorbents, and lubricants (oil and grease). Amounts of these wastes would be minor and if handled in the same manner as that described for the project site, would present an insignificant risk to workers and the public. It is anticipated that up to 600,000 gallon of cleaning and passivating liquid waste would be generated during construction. And another 13,100 gallons of waste oil would be generated (E&LW, 2006a §8.13.2.1.1).

The construction contractor would be considered the generator of hazardous wastes at this site during the construction period; therefore, prior to construction, the project owner would be required to obtain a unique hazardous waste generator identification number from DTSC in accordance with DTSC regulatory authority, pursuant to proposed Condition of Certification **Waste-3**. Wastes would be accumulated at satellite locations and then transported daily to the construction contractor's 90-day hazardous waste storage area located in the construction laydown area in response to Title 22, California Code of Regulations Section 66262.34 et seq. The wastes thus accumulated would be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Table 8.13-1 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-4** to notify the Compliance Project Manager (CPM) whenever the owner becomes aware of this action.

Operation Impacts and Mitigation

The proposed CGS would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan pursuant to proposed Condition of Certification **Waste-5**.

Nonhazardous Solid Wastes

Nonhazardous solid wastes that may be generated during operation include maintenance wastes and office wastes. Non-recyclable wastes would be regularly transported off site to a solid waste disposal facility (E&LW, 2006a §8.13, Table 8.13-4).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during facility operation and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with a Drainage, Erosion, and Sediment Control Plan. General facility drainage will consist of area washdown, sample drains, equipment leakage, and drainage from facility equipment areas and would be discharged to the wastewater collection system.

Area drains will be located by mechanical equipment where it is determined that oil could mix with rainwater or other water sources. The water collected by these drains will go to the oil-water separator, combined with the plant process wastewater and then discharged into the storm drain system. Water is then conveyed to the storm water detention basin (E&LW, 2006a §8.14.1.5).

Hazardous Wastes

The applicant would be the generator of 57 tons per year of hazardous wastes at this site during operations; thus, the project owner's unique hazardous waste generator identification number obtained during construction would still be required for generation of hazardous waste, pursuant to proposed Condition of Certification **Waste-3**. Hazardous wastes that may be generated during routine project operation include waste lubricating oil, lubrication oil filters from the combustion turbines, spent Selective Catalytic Reduction catalyst, oily rags, laboratory analysis waste, oil sorbents, and chemical feed area drainage. Table 8.13-4 of the AFC provides a list of wastes, the amounts expected to be generated, and their disposal methods.

The amounts of hazardous wastes generated during the operation of CGS would be minimal, and recycling methods would be used to the extent possible. The potential for accidental hazardous material release to the environment is extremely small (see **Hazardous Materials** section). The existing LORS ensure that the environment is protected. The remaining hazardous waste would be temporarily stored on site, pursuant to the California Fire Code and Title 22, California Code of Regulations,

Section 66262.10 et seq., and disposed of by licensed hazardous waste collection and disposal companies in accordance with all applicable regulations, pursuant to Title 22, California Code of Regulations Section 66262.10 et seq. Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **Waste-4** to notify the CPM whenever the owner becomes aware of this action.

Impact on Existing Waste Disposal Facilities

Nonhazardous Solid Wastes

Nonhazardous waste disposal sites suitable for discarding project-related construction and operation wastes are identified in Section 8.13.2.2 of the AFC (E&LW, 2006a Table 8.13-2). During construction of the proposed project, 40 cubic yards per week of solid waste will be generated and disposed of in solid waste management landfills (E&LW, 2006a Table 8.13-1). The nonhazardous solid wastes generated yearly at CGS would be recycled if possible or disposed of in a Class III landfill.

The landfills listed in Table 8.13-2 of the AFC all have adequate remaining capacity and tentative closure dates to make them all adequate choices for disposing of solid waste. The total amount of nonhazardous waste generated from project construction and operation will contribute less than one percent of available landfill capacity. Staff finds that disposal of the solid wastes generated by CGS can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 8.13.2.2 of the AFC discusses the three Class I landfills in California: the Safety Kleen Buttonwillow Landfill in Kern County, the Safety Kleen Landfill in Imperial County, and the Chemical Waste Management Kettleman Hills Landfill in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is an excess of 16 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with up to 16 years of remaining operating lifetimes. In addition, the Kettleman Hills facility is in the process of permitting an additional 15 million cubic yards of disposal capacity, and the Buttonwillow facility is not expected to reach its capacity until 2030 at current disposal rates (E&LW, 2006a Table 8.13-2). The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators and the transport to out of state of waste out that is hazardous under California law, but not federal law.

Most of the hazardous waste generated by the CGS would be generated during facility construction and startup in the forms of flushing and cleaning liquids. The Selective Catalytic Reduction (SCR) catalysts would require regeneration every three to five years resulting in the generation of a total of 120,000 pounds of waste material that could require disposal in a Class I facility if recycling or regeneration proves not to be feasible. All hazardous wastes generated during both construction and operation would be transported off site to a permitted treatment, storage, or disposal (TSD) facility for appropriate disposition, preferably recycling. The volume of hazardous waste from the CGS requiring off-site disposal would be far less than staff's threshold of significance

(10 percent of the existing combined capacity of the three Class I landfills) and would therefore not significantly impact the capacity or remaining life of any of these facilities.

CUMULATIVE IMPACTS AND MITIGATION

Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.). As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of CGS would add to the total quantities of waste generated in Colusa County and in the State of California. During construction, this facility would generate an estimated 40 cubic yards per week of solid waste per week. Overall, wastes would be generated in minimal quantities, recycling efforts would be prioritized wherever practical, and capacity is available in a variety of treatment and disposal facilities. Therefore, staff concludes that these added waste quantities generated by CGS would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the CGS would comply with all applicable LORS regulating the management of hazardous and nonhazardous wastes during facility demolition, construction, and operation. The applicant is required to dispose of hazardous and nonhazardous wastes at facilities approved by the various departments within Cal/EPA. Because hazardous wastes would be produced during both project construction and operation, the CGS project would be required to obtain a hazardous waste generator identification number from DTSC. Accordingly, CGS would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees. Pursuant to California Code of Regulations, the Colusa must prepare Title 22, Section 67100.1 et seq.. The applicant must prepare a hazardous waste Source Reduction, Evaluation Review, and Plan.

In the **Socioeconomics** section of the staff analysis, staff presents census tract information (as identified in **Socioeconomics Figure 1)** that shows minority populations are less than 50 percent of the population within one-mile and six-mile radiuses of the project. Therefore, there are no environmental justice issues associated with this project as it relates to the **Waste Management** analysis.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received comments to date.

CONCLUSIONS

Staff has proposed Conditions of Certification **Waste-1** through **5** which require: 1) that the project owner have an experienced Registered Professional Engineer or Geologist

available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; 2) that if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling nature, file a written report, and seek guidance from the Compliance Project Manager and the appropriate regulatory agencies; **3)** that the project owner obtain a unique hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority; **4)** that the project owner notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action; and **5**) that the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM.

Management of the waste generated during construction and operation of the Colusa Generating Station or those associated with remediation of existing on-site contamination would not result in any significant adverse impacts if the measures and remediation proposed in the AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the Compliance Project Manager (CPM) for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Registered Professional Engineer or Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner, representatives of Department of Toxic Substances Control, and CPM stating the recommended course of action and obtain approvals from the Department of Toxic Substances Control.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall

contact representatives of the Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep his copy of the identification number on file at the project site and notify the CPM via the relevant Monthly Compliance Report of its receipt.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- a description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- methods of managing each waste, including temporary on-site storage, treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM for approval.

The Operation Waste Management Plan shall be submitted to the CPM no less than 30 days prior to the start of project operation for approval. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year and provide a comparison of the actual

methods used to those methods management proposed in the original Operation Waste Management Plan.

REFERENCES

E&LW (E&L Westcoast, Inc.). 2006a. E&L, LLC/ A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

WORKER SAFETY AND FIRE PROTECTION

Rick Tyler and Alvin Greenberg PhD

SUMMARY OF CONCLUSIONS

Staff concluded that if the applicant for the proposed Colusa Generating Station provides a project construction safety and health program and a project operations and maintenance safety and health program, as required by Conditions of Certification **WORKER SAFETY -1, -2, -3, -4,** and **-5,** the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the construction safety and health program and the operations and maintenance safety and health program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

However, staff also concludes that the proposed project would have significant impacts on local fire protection services. The Colusa Generating facility would be located approximately 4 miles west of Interstate 5 in Colusa County. The site is currently undeveloped agricultural land used for cattle grazing. The fire and hazardous materials risks of the facility pose significant added demands on local fire protection services in conjunction with anticipated local growth. Fire protection services are currently provided by the Maxwell Fire Protection District, which is an all-volunteer department. Staff also concludes that the Maxwell Fire Protection District Hazardous Materials Response Unit is inadequately equipped and staffed to respond to a minor hazardous materials incident at the proposed facility.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS) at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this PSA is to assess the worker safety and fire protection measures proposed by the Colusa Generating Station (CGS) 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.

WORKER SAFETY AND FIRE PROTECTION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code, sections 651 et seq (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources."
29 CFR, sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration safety and health regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR, sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR, all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 CCR, section 3 et seq.	Incorporates the current addition of the Uniform Building Code.
Health and Safety Code, section 25500 et seq.	Risk management plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code, sections 25500 to 25541	Requires a hazardous material business plan detailing emergency response plans for hazardous materials emergency at a facility.
Local	
1998 edition of California Uniform Fire Code and all applicable NFPA standards (24 CCR, part 9)	NFPA standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including: 1) required road and building access, 2) water supplies, 3) installation of fire protection and life safety systems, 4) fire-resistive construction, 5) general fire safety precautions, 6) storage of combustible materials, 7) exits and emergency escapes, and 8) fire alarm systems. The California Uniform? Fire Code incorporates current editions of the UFC standards.

Applicable Law	Description
California Building Code Title 24 California Code of Regulations (24 CCR § 3 et seq.)	Comprising eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The California Building Standards Code incorporates current editions of the Uniform Building Code and includes the electrical, mechanical, energy, and fire codes applicable to the project.
Uniform Fire Code 1997	Contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

SETTING

First responders to all incidents at the CGS would be the on site trained staff. First off site fire support services to the facility will be under the jurisdiction of the Maxwell Fire Protection District (MFPD). The closest MFPD station is located 7.5 miles from the CGS in Maxwell, CA. The approximate response time would be 15 to 20 minutes.

The MFPD would also provide first off site response for hazardous materials incidents. A recent fire service impact study has determined that the response capability of the MFPD to the proposed facility would not comply with the recommendation in NFPA section 1720 (L&M 2007d). In the unlikely event of a major hazardous materials incident, the emergency response team from Maxwell would be the first offsite responder and would not allow response to other facilities at the same time should the need arise.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed for worker safety and fire protection:

1. the potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. fire prevention and protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are a matter of adhering to the spirit and intent of the Cal-OSHA regulations. This is essentially a LORS compliance matter, and 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 onsite fire-fighting systems proposed by the applicant and the time needed for offsite local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If onsite systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response times 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 would, 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 project would be exposed to loud noises, moving equipment, trenches, and confined space ingress and egress problems. The workers could experience falls, trips, burns, lacerations, and numerous other injuries. They could be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the CGS to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A safety and health program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "safety and health program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The CGS 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 8 California Code of Regulations, sections 1502 and the following. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The construction safety and health program will include the following:

- a construction injury and illness prevention program (8 CCR § 1509);
- a construction fire prevention plan (8 CCR § 1920);
- a personal protective equipment program (8 CCR §§ 1514 to 1522); and
- an emergency action program and plan.

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§ 2299 to 2974), and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will include:

- an electrical safety program;
- accident/incident reporting procedures;
- a blood-borne pathogens exposure control program;
- a chemical hygiene plan;
- a code of safe practices for equipment and operation;
- compressed gas and air handling systems;
- an emergency action plan;
- emergency response procedures;
- a fire protection and prevention plan;
- hazardous materials handling procedures;
- provision of hoists, chains, wires, ropes, webs, rope slings, and cranes;
- an industrial hygiene program;
- a lock-out and tag-out procedure;
- a personal protective equipment program;
- provision of portable electric and pneumatic tools;
- repetitive stress injuries ergonomics lifting hazards;
- a safety and housekeeping Inspection program;
- a safety committee and toolbox/tailgate safety meetings;
- a security program;
- a stop work authority;
- signs, tags, and barricades
- a motor vehicle and heavy equipment safety program;
- a forklift operation program;
- an excavation and trenching program;
- a fall protection program;
- a scaffolding and ladder safety program;
- an articulating-boom platforms program;
- a crane and material handling program;
- a housekeeping and material handling and storage program;
- a respiratory protection program;

- an employee exposure monitoring program;
- a hand and portable power tool safety program;
- a hearing conservation program;
- a back injury prevention program;
- a hazard communication program;
- a heat and cold stress monitoring and control program;
- a pressure vessel and pipeline safety program;
- a hazardous waste program;
- a hotwork safety program;
- a permit-required confined-space entry program; and
- a demolition procedure (if applicable).

The AFC includes adequate outlines of each of the above programs (E&L 2006a). Prior to the start of construction of the CGS, detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-1.**

Operations and Maintenance Safety and Health Program

Prior to the start of operations at the CGS, the operations and maintenance safety and health program will be prepared. This program will include the following:

- an injury and illness prevention program (8 CCR § 3203);
- a fire prevention program (8 CCR § 3221);
- a personal protective equipment program (8 CCR §§ 3401 to 3411); and
- an emergency action plan (8 CCR § 3220).

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

The AFC includes adequate outlines of the injury and illness prevention program, emergency action plan, fire prevention program, and personal protective equipment program (E&L 2006a). Prior to operation of the CGS, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2.**

Safety and Health Program Elements

The measures included in both of the applicant's proposed safety and health programs (one for construction and one for operations) are derived from applicable sections of state and federal law. The major items required in both programs are as follows:

Injury and Illness Prevention Program

This program will include the following components as presented in the AFC (E&L 2006a):

- the identity of persons with authority and responsibility for implementing the program;
- the safety and health policy of the plan;
- definitions of work rules and safe work practices for construction activities;
- systems for ensuring that employees comply with safe and healthy work practices;
- systems for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary programs;
- methods for correcting unhealthy or unsafe conditions in a timely manner;
- training and instruction requirements and programs; and
- specific safety procedures.

Fire Prevention Plan

California Code of Regulations requires an operations fire prevention plan (8 CCR § 3221). The AFC outlines a proposed fire prevention plan that is acceptable to staff (E&L 2006a). The plan will include the following topics:

- general program requirements;
- a fire hazard inventory, including ignition sources and mitigation;
- good housekeeping practices and proper materials storage;
- employee alarm and/or communication systems;
- provision of portable fire extinguishers at appropriate site locations;
- locations of fixed fire-fighting equipment in suitable areas;
- specific fire-control requirements and procedures;
- proper flammable and combustible liquid storage facilities;
- the location and use of flammable and combustible liquids;
- proper dispensing and disposal requirements for flammable liquids;
- training and instruction requirements and programs; and
- personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final fire prevention plan to the Energy Commission compliance project manager (CPM) for review and approval and to the CGS for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1 and WORKER SAFETY-2.**

Personal Protective Equipment Program

California regulations require the availability of personal protective equipment (PPE) and first aid supplies whenever hazards are present that, due to processes, environments, chemicals, or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR §§ 3380 to 3400). The CGS operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

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

The PPE program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an emergency action plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (E&L 2006a). The outline lists the following features:

- emergency escape procedures and emergency escape routes for the facility;
- procedures to be followed by employees who remain to for critical plant operations before they evacuate;
- procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specific rescue and medical duties for assigned employees;
- fire and emergency reporting procedures to regulatory agencies;
- alarm and communication systems for the facility;
- a list of personnel to contact for information on the plan contents;
- emergency response procedures for ammonia release; and
- training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS apply to the project and are called "safe work practices." Both the construction and the operations safety programs will address safe work practices under a variety of programs. The

components of these programs include, but are not limited to those found above under **Construction Safety and Health Program** of this staff assessment:

In addition, the project owner will be required to provide personal protective equipment and exposure monitoring for workers who are involved in activities on sites where contaminated soil and/or contaminated groundwater exist as per staff's proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2.**

These proposed Conditions of Certification would ensure that workers are properly protected from any hazardous wastes presently at the site.

Safety Training Programs

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

Additional Mitigation Measures for Worker Safety

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by NIOSH:

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent 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 fatalities than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Fifteen percent of workers' compensation costs are spent on construction injuries.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity to each other.
- 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 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. To reduce and/or eliminate these hazards, it has become standard industry practice to hire a construction safety supervisor to ensure a safe and healthful environment for all personnel. This has been evident in the audits of power plants under construction recently conducted by the staff.

The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and

recognize safety professionals trained as construction safety supervisors, construction health and safety officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (fall, 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 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 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 and/or project owner to designate and provide for a power plant site construction safety supervisor.

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 were 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 or 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;
- inappropriate and unsecured 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.

To reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a safety professional monitor onsite 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 monitor, hired by the project owner yet reporting to the chief building officer and CPM, will serve as an extra set of eyes to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site-safety professionals welcomed the audit team and actively engaged them in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed CGS, there is a potential for both small fires and major structural fires. Electrical sparks; combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid, flammable liquids, explosions and over-heated equipment may cause small fires at the power plant switchyard. However, major structural fires in areas with automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to assure protection from all fire hazards.

The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the Maxwell Fire Protection District (E&L 2006a, section 8.7).

Construction

During construction, portable fire extinguishers will be located throughout the site, and safety procedures and training will be implemented. In addition, Maxwell Fire Protection District will provide fire protection backup for larger fires that can not be extinguished using the portable suppression equipment.

Operation

The AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire-extinguishing systems. Water for fighting fires will be supplied from a dedicated 300,000 gallon fire-water storage tank and delivered to the underground firewater loop with fire hydrants at approximately 300-foot intervals (E&L 2006a).

A carbon dioxide protection system will be provided for the combustion turbine generators and accessory equipment. The system will have fire-detection sensors that

will trigger alarms, turn off ventilation, close ventilation openings, and automatically release the carbon dioxide (E&L 2006a).

In addition to the fixed fire-protection system, smoke detectors, flame detectors, temperature detectors, and appropriate class-of-service portable extinguishers and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirement by the NFPA and the UFC and staff has determined that they will ensure adequate fire protection.

The applicant would be required by **WORKER SAFETY-1** and **WORKER SAFETY-2** to provide the final fire protection and prevention program to staff and to the Maxwell Fire Protection District prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Response

A state-wide survey was conducted by staff to determine the frequency of emergency medical response and 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 emergency medical 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 nonwork-related heart attacks exists at power plants. In fact, staff's research on the frequency of emergency medical response to gas-fired power plants shows that many of the responses are for cardiac emergencies involving nonwork-related incidents, including visitors. The need for prompt response within a few minutes is well documented in medical literature.

Staff believes that the quickest medical intervention can only be achieved with the use of an onsite defibrillator; the response from an offsite 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 facilities (e.g., airports, factories, government buildings) maintaining onsite cardiac defibrillation devices. 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 to convert cardiac arrhythmias resulting from industrial accidents or other nonwork-related causes. Therefore, an additional condition of certification, **WORKER SAFETY-5**, is proposed, which would require that a portable automatic cardiac defibrillator be located on site.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the CGS, combined existing industrial facilities and expected new facilities, to result in impacts on the emergency service capabilities of the Maxwell Fire Protection District (MFPD) and determined that cumulative impacts were significant. Both the MFPD and a recent fire service impact study indicate inadequacy of the MFPD to respond effectively to both the local community and the proposed CGS facility. Given the small size of the community where the project would be located, and the lack of significant fire hazards associated with a modern gas-fired power plant, staff concludes that if the MFPD were provided

funding to address staffing, training, and equipment needs, this project would not have a significant incremental burden on the district's ability to respond to a fire or medical emergences.

CONCLUSIONS

Staff concluded that if the applicant provides a project construction safety and health program and a project operations and maintenance safety and health program, as required by Conditions of Certification **WORKER SAFETY-1,** and **–2,** and fulfils the requirements of **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS.

Staff further concludes that the project would have significant impacts on local fire protection services. Staff cannot recommend approval of the proposed project until the funding needs of the MFPD are addressed. Staff also recommends that, if this project is approved, the Commission adopt the conditions of certification herein. In reaching its conclusions regarding adequacy to fire protection services, staff considered minority populations (as identified in **Socioeconomics Figure 1**) and found no disproportionate impacts.

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 Maxwell Fire Protection District for review and comment prior to submittal to the CPM for approval.

Verification: At least thirty (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 Maxwell Fire Protection District providing the fire district'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;
- a hazardous materials management program;
- a fire prevention program (8 CCR § 3221);
- a fire protection program; and
- a personal protective equipment program (8 CCR §§ 3401 to 3411).

The operation injury and illness prevention plan, emergency action plan, and personal protective equipment program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable safety orders. The operation fire prevention program plan and the emergency action plan shall also be submitted to the Maxwell Fire Protection District for review and comment.

Verification: At least thirty (30) days prior to the start of power plant 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 Maxwell Fire Protection District providing the fire district's comments on the operations hazardous materials management program, fire prevention plan and emergency action plan.

WORKER SAFETY-3 The project owner shall provide a site construction safety supervisor 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 construction safety supervisor 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, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- assure that all the plans identified in **WORKER SAFETY-1 and WORKER SAFETY-2** are implemented.

Verification: At least thirty (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 . The contact information of any replacement construction safety supervisor shall be submitted to the CPM within one business day.

The construction safety supervisor shall submit in the monthly compliance report a monthly safety inspection report to include:

- a record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- a summary report of safety management actions and safety-related incidents that occurred during the month;
- a report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- a 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 shall be responsible for verifying that the construction safety supervisor, as required in **WORKER SAFETY-3**, implement all appropriate Cal/OSHA and Energy Commission safety requirements. The safety monitor shall conduct onsite (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the safety monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic cardiac defibrillator is located on site during construction and operation and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM for review and approval proof that a portable automatic cardiac defibrillator exists on site and a copy of the defibrillator training and maintenance program.

REFERENCES

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

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

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

ENGINEERING ASSESSMENT

FACILITY DESIGN

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Staff concludes that the design, construction and eventual closure of the Colusa Generation Station 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 project. The purpose of the facility design analysis is to:

- verify that the laws, ordinances, regulations, and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site that could influence public health and safety; and
- describe the design review and construction inspection process and establish conditions of certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- identification of the engineering LORS applicable to facility design;
- evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- proposed modifications and additions to the application for certification (AFC) that are necessary to comply with applicable engineering LORS; and
- conditions of certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (E&L 2006a, Apps A through E). The key LORS are listed in **Facility Design Table 1** below:

FACILITY DESIGN Table 1
Key Engineering Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	Title 29, Code of Federal Regulations, Part 1910, Occupational Safety and Health Standards
State	California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Colusa County regulations and ordinances
General	American National Standards Institute American Society of Mechanical Engineers American Welding Society American Society for Testing and Materials

SETTING

The Colusa Generating Station (CGS) will be located approximately 4 miles west of Interstate 5 and approximately 72 miles north of the City of Sacramento. The project will be located on a 100-acre site off Dirk Road in an unincorporated area of Colusa County. The site will lie in seismic zone 3. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC, in Appendices A through E (E&L 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project is built to the applicable engineering codes to ensure public health and safety. The analysis verifies that the applicable engineering LORS have been identified and that the project and ancillary facilities have been described in sufficient detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification to monitor and ensure compliance with the engineering LORS and any special design requirements. These conditions allow 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. Staff has assessed the criteria for designing and

constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes to use accepted industry standards (see E&L 2006a, Appendices A through E for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and **Geology and Paleontology**) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly or time consuming to repair or replace; are used for the storage, containment, or handling of hazardous or toxic materials; or may become potential health and safety hazards if not constructed according to the applicable engineering LORS. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** below.

The AFC contains lists of the civil, structural, mechanical, and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project would be designed and constructed to the 2001 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction of the project actually commence. In the event the initial designs are submitted to the chief building official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required under the CBC to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1**, which in part requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (E&L 2006a, section 3.9.3.9) describes a project quality program that will be used on the CGS project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure

that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design conditions of certification are met. As provided by section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in-lieu permit fees are paid by the applicant consistent with CBC section 107 to cover the costs of reviews and inspections.

Engineering and compliance staff will invite the local building authority, Colusa County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical, and electrical portions of the project are required to be registered in California, and to sign and stamp all design plans, calculations, and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval that would be difficult to reverse or correct may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from “mothballing” to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

To assure that decommissioning of the facility will be completed in a manner that is environmentally sound and safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans, and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions** later in this PSA) to ensure that these measures are included in the facility closure plan.

CONCLUSIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project are likely to comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking, and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan, as required in **General Conditions,** prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

Energy Commission staff recommends that:

1. the conditions of certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;

2. the project be designed and built to the 2001 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and

3. the CBO shall review the final designs, conduct plan checking, and perform field inspections during construction. Energy Commission staff will audit and monitor the CBO to ensure satisfactory performance.

PROPOSED CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously. The project owner shall insure that all the provisions of the above applicable codes be enforced during any construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility (2001 CBC, § 101.3, Scope). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in **Transmission System Engineering**.

In the event that the initial engineering designs are submitted to the CBO when a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction, or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers shall clearly specify that all work performed and materials supplied on this project comply with the codes listed above.

Verification: Within 30 days after receipt of the certificate of occupancy, the project owner shall submit to the compliance project manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project

owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO (2001 CBC, § 109, Certificate of Occupancy).

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that may require CBO approval for the purpose of complying with the above stated codes. The CPM will then determine the necessity of CBO approval on the work to be performed.

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a master drawing list and a master specifications list. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

Verification: At least 60 days (or project owner- and CBO-approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing list and the master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 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 & Generator (CTG) Foundation and Connections	2
Steam Turbine & Generator (STG) Foundation and Connections	1
Heat Recovery Steam Generator (HRSG) & Stack Structure, Foundation and Connections	2
CTG Main Transformer Foundation and Connections	2
STG Main Transformer Foundation and Connections	1
Electrical Auxiliary Transformers Foundation and Connections	5
CTG Air Inlet Structure, Foundation and Connections	2
CEMS Enclosure Structure, Foundation and Connections	2
Air Cooled Condenser Structure, Foundation and Connections	1
Auxiliary Boiler Structure, Foundation and Connections	1
Boiler Feed Water Pump Foundation and Connections	2
Fuel Gas Separator and Heating Foundation and Connections	2
CTG Support Skid Foundation and Connections	2
Power Distribution Center Foundation and Connections	5
Demineralized Water Storage Tank Structure, Foundation and Connections	1
Fire Water Pump Skid Foundation and Connections	1
HRSG Blowdown Tank and Sump Structure, Foundation and Connections	2
Gas Metering and Regulating with Fuel Gas Filter/Separators Foundation and Connections	2
Water Treatment Area Structure, Foundation and Connections	1
Ammonia Transfer Pumps Foundation and Connections	3
Raw/Firewater Tank Structure, Foundation and Connections	1
Septic Tank Structure, Foundation and Connections	1
Storage Building Structure Foundation and Connections	2
Condensate Tank and Pumps Foundation and Connections	1
Fin Fan Coolers Structure, Foundation and Connections	1
Ammonia Dilution Skid Foundation and Connections	2
STG Electrical Equipment Foundation and Connections	1
Switchgear Building Structure, Foundation and Connections	1
Unit Auxiliary Transformer Foundation and Connections	2
Generator Breaker Foundation and Connections	2
Emergency Diesel Generator Foundation and Connections	1
Hydrogen Storage Area Tank Structure, Foundation and Connections	1
Phosphate Feed Skid Foundation and Connections	2
Sample Panel Foundation and Connections	2
Auxiliary Cooling Water Pumps & Heat Exchanger Foundation and	1

Equipment/System	Quantity (Plant)
Connections	
Oil/Water Separator Foundation and Connections	1
Control Room/Administration Building Structure, Foundations and Connections	1
STG Lube Oil Skid Foundations and Connections	1
Switchyard Control House 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
Glenn-Colusa Canal Bridge Replacement Structure, Foundation and Connections	1
Teresa Creek Bridge Replacement Structure, Foundation and Connections	1

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2001 CBC (Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees), adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that the applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project (Building Standards Administrative Code, Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in **Transmission System Engineering**.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided each part is clearly

defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;

2. ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these conditions of certification, approved plans, and specifications;

3. prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;

4. be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications, and any other required documents;

5. be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a

civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) 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: D) 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; E) a mechanical engineer; and F) 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 conditions of certification in **Transmission System Engineering**.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project (2001 CBC, section 104.2, Powers and Duties of Building Official).

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations report, geotechnical report, or soils report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design, or be responsible for design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering shall:

1. review all the engineering geology reports;

2. prepare the foundation investigations report, geotechnical report, or soils report containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement, or collapse when saturated under load (2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations);

3. be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and

4. recommend field changes to the civil engineer and RE.

   This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations (2001 CBC, section 104.2.4, Stop Orders).

C. The engineering geologist shall:

1. review all the engineering geology reports and prepare 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 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

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 engineering submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

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 timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer, and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2001 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Types of Work (requiring special inspection); and Section 106.3.5, Inspection and Observation Program. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in **Transmission System Engineering**.

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. observe the work assigned for conformance with the approved design drawings and specifications;

3. furnish inspection reports to the CBO and RE (all discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]); and

4. submit a final signed report to the RE, CBO, and CPM stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required (2001 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly

compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project (2001 CBC, Section 106.4.2, Retention of Plans). 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 final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

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 .Acrobat (pdf — version 6.0 or later) files, with restricted printing privileges (i.e., password protected) on archive-quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. the design of the proposed drainage structures and the grading plan;

2. an erosion and sedimentation control plan;

3. related calculations and specifications, signed and stamped by the responsible civil engineer; and

4. soils report, geotechnical report, or foundation investigations report required by the 2001 CBC (Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations).

Verification: At least 15 days (or project owner- and CBO-approved alternative timeframe) prior to the start of site grading, the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area (2001 CBC, Section 104.2.4, Stop Orders).

Verification: The project owner shall notify the CPM within 24 hours when earthwork and construction are stopped as a result of unforeseen adverse geologic or soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2001 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO and the CPM (2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, noncompliance 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 nonconformance 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 next monthly compliance report.

CIVIL-4 After completion of finished grading, 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 (2001 CBC, Section 3318, Completion of Work).

Verification: Within 30 days (or project owner- and CBO-approved alternative timeframe) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, with a copy of the transmittal letter to

the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 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 commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall carry out the following.

1. Obtain approval from the CBO of lateral force procedures proposed for project structures.

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality-control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications (2001 CBC, Section 108.4, Approval Required).

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation (2001 CBC, Section 106.4.2, Retention of Plans; and Section 106.3.2, Submittal Documents).

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer (2001 CBC, Section 106.3.4, Architect or Engineer of Record).

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS (2001 CBC, Section 106.3.4, Architect or Engineer of Record).

Verification: At least 60 days (or project owner- and CBO-approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 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 are in compliance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. concrete pour sign-off sheets;

3. bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. field weld inspection reports (including type of weld, location of weld, inspection of nondestructive testing procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2001 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation; and Section 1703, Nondestructive Testing.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM (2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector). The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2001 CBC, Chapter 1, Section 106.3.2, Submittal Documents and Section 106.3.3, Information on Plans and Specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in 2001 CBC, Chapter 3, Table 3-E shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the next 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** in Condition of Certification **GEN-2** above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction (2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval).

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations, and industry standards (2001 CBC, Section 106.3.4, Architect or Engineer of Record), which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);

- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Colusa County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (2001 CBC, Section 104.2.2, Deputies).

Verification: At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2** in Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and to California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation (2001 CBC, Section 108.3, Inspection Requests).

The project owner shall:

1. ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code — vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform

to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC), or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications, and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings, and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications, and calculations conform with the applicable LORS (2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record).

Verification: At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 volts and 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 (CBC 2001, Section 106.3.2, Submittal Documents). Upon approval, the above-listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS (2001 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests). All

transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in **Transmission System Engineering**.

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 or provided to the CPM in the monthly compliance report:

1. receipt or delay of major electrical equipment;

2. testing or energization of major electrical equipment; and

3. a signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above-listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

REFERENCES

E&L 2006a - E&L, LLC / A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

GEOLOGY AND PALEONTOLOGY

Patrick Pilling, Ph.D., P.E., G.E.

SUMMARY OF CONCLUSIONS

With the exception of strong ground shaking and soil expansion potential, the Colusa Generating Station (CGS) site lies in an area that generally exhibits low geologic hazards. The effects of strong ground shaking and soil expansion must be mitigated through structural design as required by the California Building Code (CBC) and the conditions of certification. The CGS has no known viable geologic or mineralogic resources. Paleontological resources have been documented in the general area of the project. Adoption of California Energy Commission (Energy Commission) staff's proposed conditions of certification will mitigate as required the potential impacts to paleontological resources due to construction activities.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to less than significant, and the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project is low. It is Energy Commission staff's opinion that the CGS can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS) and in a manner that protects environmental quality and assures public health and safety.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed CGS regarding geologic hazards and geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that no significant adverse impacts affect significant geological and paleontological resources during project construction, operation, and closure. The section provides a brief geological and paleontological overview of the project and concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of proposed conditions of certification.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The applicable LORS are listed in the Application for Certification (AFC), in Section 8.15.5, Table 8.15-2, Section 8.16.5, and Table 8.16-2 (E&LW, 2006a). The following is a brief description of the LORS for geologic hazards and resources and for mineralogic and paleontologic resources.

GEOLOGY AND PALEONTOLOGY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed CGS is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
CBSC, 2001 (particularly Part 2, CBC)	The CBC includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).
State of California Division 15 of the Public Resources Code Section 25527	The Warren-Alquist Act requires the California Energy Commission to "give 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, archeological, and cultural sites…" With respect to the paleontological resources, the Energy Commission relies on the following guidelines from the Society for Vertebrate Paleontology (SVP):
Local	
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.

SETTING

The proposed CGS site will be located on a 100-acre parcel leased by E&L Westcoast approximately 4 miles west of Interstate 5 (I-5) and 14 miles north-northwest of Williams, California. The site is presently undeveloped range land.

Linear features will include 1,800 feet of overhead electrical transmission lines from the existing north-south transmission lines east of the site. Approximately 1,500 feet of natural gas pipeline will tie into an existing north-south gas transmission pipeline east of the site, and approximately 2,700 feet of water pipeline will be constructed from the north-south Tehama-Colusa Canal west of the site. Two road bridges over the Glenn Colusa Canal and Teresa Creek will be rebuilt ½ mile and 2 miles east of the site, respectively.

REGIONAL SETTING

The proposed CGS is located within the California Great Valley and adjacent to the California Coastal Range geomorphic provinces. This area within the Great Valley is characterized by gently rolling hills, sloping to the east. Major geologic units present in the vicinity of the site include the upper Cretaceous marine sediments (including the Yolo, Sites, Funks, Guinda, and Forbes formations) and the Pleistocene Red Bluff formation (Kirby, 1943; Helley and Harwood, 1985). The upper Cretaceous marine

sediments consist of calcareous claystone and sandstone. The Red Bluff formation consists of highly weathered red pediment gravels.

PROJECT SITE DESCRIPTION

Exploration at the site generally encountered a surficial lean to fat clay, overlying a silty deposit. The surficial clay generally consists of clayey silt to silty clay ranging in depth from 2 feet to 8 feet below the existing ground surface. The surficial clay was classified as dark brown, medium-stiff to stiff and contained various amounts of roots. This material is considered highly expansive. The underlying silty deposit extends to the depths explored (80 feet) and generally consists of silt to silty sand. The silty deposit was classified as brown to light brown, stiff to hard and contained interbedded sand and clay. Ground water is reported to exist approximately 45 to 60 feet below the existing ground surface (E&LW, 2006a).

Based on the information contained in the AFC (E&LW, 2006a) and local geologic maps, Pleistocene Alluvium and upper Cretaceous marine sediments are anticipated along the proposed process water supply pipeline, underground electrical, and natural gas pipeline alignments. Ground water is most likely present at depths similar to those discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts: impacts that geologic hazards could have on proper functioning of the proposed facility, and impacts the proposed facility could potentially have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS with respect to geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Commission (CBSC) and CBC provide geotechnical and geological investigation and design guidelines, to which engineers must adhere when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to the ability to adequately design and construct the proposed facility. Geologic hazards to be considered for all projects include the potential for faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches. With the exception of ground rupture on the site and tsunamis, a number of common engineering solutions exist to mitigate geological hazards.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature. This assessment is a matter of judgment with the potential for differing options.

- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources. In most cases, mineral resources are well established and there is little potential for new discoveries.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, staff has reviewed geologic and mineral resource maps for the surrounding area, as well as any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. If present, staff also reviews operating procedures of the proposed facility—in particular ground water extraction and mass grading—to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information provided by the applicant (E&LW, 2006c), in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, conditions of certification are applied to the project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking during an earthquake and expansive clay soils represent the only known geologic hazards at this site. The potential hazards can be effectively mitigated through facility design as required by the CBC (2001). Conditions of Certification **GEO-1**, and **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section, should also mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist in the area. The applicant's consultant conducted a paleontological resource field survey (E&LW, 2006c) and has assigned the native materials as having a medium to high sensitivity rating with respect to containing significant paleontologic resources. Based on SVP assessment criteria and because the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability of encountering paleontological resources to be high during such activities, particularly when native materials are encountered. Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards and protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards and to potential geologic, mineralogic, and paleontologic resources from the proposed project is very low.

GEOLOGICAL HAZARDS

The AFC (E&LW, 2006a) provides documentation of potential geologic hazards at the CGS plant site, in addition to subsurface exploration information. Review of the AFC, coupled with staff's independent research, indicates that the potential for geologic hazards to impact the plant site is low.

Staff's independent research included review of available geologic maps, reports, and related data of the CGS site. Geological information was available from the California Geological Survey, California Division of Mines and Geology (CDMG), U.S. Geological Survey (USGS), and other governmental organizations.

Faulting and Seismicity

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 *Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998).

The project is located within Seismic Zone 3 as delineated on Figure 16-2 of the CBC. No known faults cross the proposed CGS site or proposed linear facility improvements. The closest known active fault is the Coast Ranges–Sierran Block Boundary Zone (CRSBBZ), located approximately five miles west of the site. Energy Commission staff has calculated an estimated deterministic peak horizontal ground acceleration for the project on the order of 0.4g, where g is the acceleration due to gravity. This estimate is based upon a moment magnitude 6.75 earthquake in the CRSBBZ. The USGS estimates a 10 percent probability of exceedence of a peak bedrock ground acceleration of 0.18g in 50 years (USGS, 2001). The closest Quaternary fault is the Sites-Paskenta Segment of the blind, west-dipping thrust ramps present beneath the Western Sacramento Valley; however, this fault is considered only potentially active by William Lettis and Associates (1997).

The potential of surface rupture on a fault at the energy facility footprint is considered to be very low, since no faults are known to have ruptured the ground surface of the proposed energy facility location.

Liquefaction

Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event. During the seismic event, cyclic shear stresses cause the development of excessive pore water pressure between the soil grains, effectively reducing the internal strength of the soil. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) and very soft silts lying below the ground water table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic settlements of overlying structural improvements and lateral spreading of the liquefied layer when confined vertically but not horizontally. Information contained in the AFC (E&LW, 2006a) indicates ground water is most likely present at depths between 45 and 60 feet below existing grade. The borings also indicate the site is underlain by surficial clay soils overlying silt to the depths explored (80 feet). As a result, the potential for liquefaction and associated lateral spreading of site soils is negligible.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the site is underlain by clay and silt soils, the potential for dynamic compaction is negligible.

Hydrocompaction

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon prolonged submergence. Destruction of the bonds causes a substantial decrease in the material's void ratio even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Based on the nature and density of the existing native soils, hydrocompaction is not considered significant at the proposed CGS site.

Subsidence

Ground subsidence is typically caused when ground water is drawn down by irrigation activities, increasing the effective unit weight of the soil mass, which in turn increases the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Since ground water is generally present at a significant depth (45+ feet) and since CGS will obtain surface water from the Glenn-Colusa Irrigation District via the existing Tehama-Colusa Canal and a new water pipeline to the site, significant draw down of the water table due to CGS operations is not anticipated. As a result, the potential for ground subsidence is considered low.

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, and so forth causes the clay soils to collect water molecules in their structure which, in turn, causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. The superficial clay soils that are present at the site exhibit a high potential to expand with an increase in moisture content (E&LW, 2006a). As a result, mitigation of clay soils will be necessary. Mitigation will include over-excavation of these soils below medium to lightweight structures, and possibly the use of deep foundations for heavy structures.

Landslides

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer which exhibits a relatively low strength. Debris-flows are shallow landslides that travel downslope very rapidly as muddy slurry. The AFC states

the landslide potential map contained in the Colusa County General Plan indicates the area is considered to exhibit low landslide and debris-flow potential. As a result and based on the staff's review of the site geology as presented in the AFC (E&LW, 2006a), the potential for landslides and debris-flows at the site is considered low.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves which inundate low-lying areas adjacent to large bodies of water. The proposed site is situated approximately 160 to 190 feet above mean sea level and approximately 35 miles northeast of Clear Lake, which is the closest major body of water with potential to experience a seiche. As a result, the potential for tsunamis and seiches to affect the site is considered negligible.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps for this area (CDMG, 1992). Based on this information and the information contained in the AFC (E&LW, 2006a), there are no known geologic or mineralogic resources located at or immediately adjacent to the proposed CGS site. Results of the geotechnical investigation indicate that the project site would not be suitable for commercial aggregate production.

The applicant's consultant conducted a paleontologic resources field survey and a sensitivity analysis for the proposed CGS and the proposed linear facility improvements to support the CGS (E&LW, 2006c). No significant fossil fragments were identified; however, surficial geologic units have been assigned a "moderate to high" sensitivity rating with respect to potentially containing paleontological resources. Based on this information and staff's review of available information (University of California, Berkeley, 2002), the proposed CGS site has the potential to contain significant paleontologic resources.

Construction Impacts and Mitigation

Clay soils, which exhibit the potential to consolidate when subjected to loading and expand/contract when subjected to moisture content fluctuations, are present at the site and must be addressed during design and construction (See Conditions of Certification **GEO-1,** and **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section).

As noted above, no viable geologic or mineralogic resources are known to exist in the area.

Site soils will exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Based on SVP assessment criteria and because construction of the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability of encountering paleontological resources to be moderate or high during such activities, particularly when native materials are encountered. Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

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 and expansive soils, can be effectively mitigated through facility design so as not to affect operation of the facility (see Conditions of Certification **GEO-1,** and **GEN-1, GEN-5**, and **CIVIL-1** in the **Facility Design** section).

CUMULATIVE IMPACTS AND MITIGATION

With the exception of strong ground shaking and potential soil expansion, the CGS site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. Strong ground shaking and potentially expansive soils must be mitigated through foundation design as required by the CBC, Conditions of Certification **GEO-1**, and **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. The potential impacts to paleontological resources due to construction activities will be mitigated as required by Conditions of Certification **PAL-1** to **PAL-7.**

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to less than significant and that the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the proposed project is very low.

Based upon the literature and archives search, field surveys, and the preliminary geotechnical investigation for the project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the power plant and associated linears. Energy Commission staff agrees with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards at the site and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears can be effectively mitigated.

The proposed conditions of certification are to allow the CPM and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards and to geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

A definition and general approach to closure is presented in the **General Conditions** section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources due to the fact that no new excavation would be expected during facility closure. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments on geology and paleontology have been received for the CGS project.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed conditions of certification are followed. 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 Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and include **GEO-1** below. Paleontological conditions of certification also follow.

GEO-1 The Soils Engineering Report required by the 2001 CBC Appendix, Chapter 33, Section 3309.5 Soils Engineering Report, should specifically include recommendations regarding the criteria for and depth of over-excavation to remove potentially expansive soils for various improvement types on this project, including major foundations, light foundations, slabs on grade, and paved areas. The minimum quality for backfill soils/structural fill should be defined. Alternatively, the minimum foundation depth may be defined for various major structures.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report, which describes the criteria for and depth of over-excavation and replacement of potentially expansive soils for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit, and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide the CPM with the resume and qualifications of his Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall submit to the CPM to keep on file resumes of the qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. institutional affiliations, appropriate credentials, and college degree;

2. ability to recognize and collect fossils in the field;

3. local geological and biostratigraphic expertise;

4. proficiency in identifying vertebrate and invertebrate fossils; and

5. at least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors 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 his designated PRS for on-site work.

2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance to greater than 5 feet depth is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the

project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited to, the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to the PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations where the monitoring of project construction activities is deemed necessary and a proposed plan for the monitoring and sampling;

6. A discussion of the procedures to be followed in the event of a significant fossil discovery: halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all recently employed project managers, construction supervisors, and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for

new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils 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 or 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 the workers are to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the Monthly Compliance Report (MCR), the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and included in the Monthly Compliance Report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS immediately notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours or Monday morning in the case of a weekend when construction has been halted due to a paleontological find.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports (MCR). The summary will include the name(s) of PRS or PRM(s) active during the month; general descriptions of training; and monitored construction activities and general locations of excavations, grading, and so forth. A section of the report shall include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list

of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed, including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the project construction.

Verification: The project owner shall maintain in his compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resource Report (see **PAL-7**). The project owner shall be responsible to pay any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Colusa Generating Station (06-AFC-9)

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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25.			

Cultural Trainer: _____ Signature: _____ Date: ___/___/___

PaleoTrainer: _____ Signature: _____ Date: ___/___/___

Biological Trainer: _____ Signature: _____ Date: ___/___/___

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CDMG (California Division of Mines and Geology). 1992. *Geologic Map of California, Ukiah Sheet*; Scale 1:250,000.

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E&LW (E&L Westcoast, LLC). 2006a. E&LW/A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

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POWER PLANT EFFICIENCY

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Colusa Generating Station (CGS), if constructed and operated as proposed, would generate 660 megawatts (MW) (nominal gross output) of electric power at an overall project fuel efficiency of 56 percent lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

The California Energy Commission (Energy Commission) makes findings as to whether energy use by the Colusa Generating Station will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the CGS's consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impact. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

E&L Westcoast, LLC (E&LW), the applicant, proposes the construction and operation of the 660-MW (nominal gross output1) combined-cycle CGS to serve energy needs throughout California (E&LW, 2006a, AFC §§1.1, 1.2). The CGS will consist of two General Electric (GE) Frame 7FA combustion gas turbines with evaporative inlet air

[1] Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.

cooling system (E&LW, 2006a, AFC §§1.1, 1.4, 3.4.2, 3.4.3), two multi-pressure heat recovery steam generators (HRSGs) with duct burners, and one three-pressure, reheat, condensing steam turbine (ST) generator producing 320 MW (nominal), arranged in a two-on-one combined-cycle train, totaling approximately 660 MW at nominal gross output. The gas turbines and HRSGs will be equipped with dry low-NOx combustors and selective catalytic reduction to control air emissions (E&LW, 2006a, AFC §§1.4, 3.4.2, 3.4.3.1, 3.4.3.2). Natural gas will be delivered to the project site through a new 1,500-foot, 8-inch diameter pipeline connection to the Pacific Gas & Electric's (PG&E) existing gas lines (E&LW, 2006a, AFC §§1.4, 1.9, 3.4.5, 3.9.3.7).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING 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 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 will consume large amounts of energy. Under normal conditions, the CGS will burn natural gas at a nominal rate of 3,214 MMBtu per hour, LHV, during base load operation (E&LW, 2006a, AFC §3.4.5). The estimated fuel consumption at the same conditions with duct firing is 4,426 MMBtu per hour, LHV. This is a substantial rate of energy consumption and holds the potential to impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 56 percent LHV (E&LW, 2006a, AFC, Figure 3.4-4B). This efficiency level compares favorably to the average fuel efficiency of a typical existing base-load power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (E&LW, 2006a, AFC §§1.4, 1.9, 3.4.5, 3.9.3.7). Natural gas for the CGS will be supplied from the existing PG&E system via a new pipeline connection. The PG&E system is capable of delivering the required quantity of gas to the CGS. The PG&E natural gas supply represents a reliable source of natural gas for this project. Therefore, it appears unlikely that the project could pose a substantial increase in demand for natural gas in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project by PG&E via a new pipeline connection (E&LW, 2006a, AFC §§1.4, 1.9, 3.4.5, 3.9.3.7). There appears to be no real likelihood that the CGS will require the development of additional energy supply capacity, since PG&E's regional supplies are considered plentiful.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the CGS or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The CGS could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The CGS will be configured as a combined-cycle power plant, in which electricity is generated by two gas turbines and additionally by a reheat steam turbine that operates on heat energy recovered from the gas turbines' exhaust (E&LW, 2006a, AFC §§1.1, 1.4, 3.4.2, 3.4.3). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined-cycle power plant is increased considerably from that of either gas turbines or a steam turbine operating alone. Such a configuration is well suited to the large, steady loads met by a base-load plant intended to supply energy efficiently for long periods of time.

The applicant proposes to use inlet air coolers, HRSG duct burners (re-heaters), three-pressure HRSGs, and a steam turbine unit and circulating cooling water system (E&LW, 2006a, AFC §§1.2, 1.4, 3.4.2, 3.4.3). Staff believes these features contribute to meaningful efficiency enhancement to the CGS. The two-train combustion turbine (CT)/HRSG configuration also allows for high efficiency during unit turndown because one CT can be shut down, leaving the other fully loaded, efficiently operating one CT instead of having two CTs operating at an inefficient 50 percent load.

The CGS includes HRSG duct burners, partially to replace heat to the ST cycle during high ambient temperatures when CT capacity drops, and partially for added power. Duct firing also provides a number of operational benefits such as load following and balancing and optimizing the operation of the ST cycle.

Equipment Selection

The F-class of the advanced gas turbines to be employed in the CGS represents some of the most modern and efficient such machines now available. The applicant will employ two GE Frame 7FA combustion gas turbine generators in a two-on-one combined-cycle power train nominally rated at 530 MW and 56.5 percent maximum full load efficiency LHV at the International Organization for Standardization (ISO) conditions (GTW, 2007).

One possible alternative is the Siemens SCC6-5000F, nominally rated in a two-on-one train combined-cycle configuration at 589.7 MW and 57.2 percent efficiency LHV at ISO conditions (GTW, 2007).

Another alternative is the Alstom Power KA24, nominally rated at 560 MW with an efficiency rating of 57.3 percent LHV at ISO conditions (GTW 2007).

Any differences among the GE 7FA, SCC6-5000F, and Alstom KA24 in actual operating efficiency will be insignificant. Selecting among these machines is thus based on other factors, such as generating capacity, cost, commercial availability, and ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

The project objectives include generation of base-load electricity and ancillary services to serve energy needs throughout California (E&LW, 2006a, AFC §§1.1, 1.2).

Alternative Generating Technologies

Alternative generating technologies for the CGS are considered in the AFC (E&LW, 2006a, AFC §§1.12, 9.6). Fossil fuels, nuclear, solar, biomass, hydroelectric, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and 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 thus strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines embody the most fuel-efficient electric generating technology available today. Currently available, large combustion turbine models can be grouped into three categories including conventional, advanced, and next generation. Advanced

combustion turbines offer advantages for the CGS. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run time in commercial operation. Emission levels are also proven, and guaranteed emission levels have been reduced based on operational experience and design optimization by the 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 employs partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency narrow, as the larger capacity G-class turbines would run at less than optimum (full) output more frequently than the 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, the applicant's decision to purchase F-class machines is a reasonable one.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60 percent LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and higher firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is currently under construction 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 employ F-class machines.

Capital cost is also important in selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing has made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler, or fogger, and the chiller. Both devices increase power output by cooling the gas turbine inlet air. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, however, it consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that applicant's choice of evaporative gas turbine inlet air cooling will yield no significant adverse energy impacts.

In conclusion, the project configuration (combined-cycle) and generating equipment (F-class gas turbines) chosen appear to represent the most efficient feasible combination to satisfy the project objectives. The two-train CT/HRSG configuration also allows for high efficiency during unit turndown because one CT can be shut down, leaving one fully loaded, efficiently operating CT instead of having two CTs operating at an inefficient 50 percent load. This offers an efficiency advantage over the larger machines during unit turndown. There are no alternatives that could significantly reduce energy consumption.

Staff, therefore, believes the CGS will not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

There are no nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project would not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the project. The older, less efficient power plants consume more natural gas to operate than the new, more efficient plants such as the CGS. Since natural gas would be burned by the power plants that are most competitive on the spot market, the most efficient plants would likely run the most. The high efficiency of the proposed CGS should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants in the market, and therefore not impacting or even reducing the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant proposes to enhance power supply reliability in the California electricity market by meeting the needs of the state's energy demand and contributing to the electricity reserves in the region. By doing so in this most fuel-efficient manner, that is, employing the most modern F-class gas turbine generator available, the CGS will provide a benefit to the electric consumers of California.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 660 MW (nominal gross output) of electric power at an overall project fuel efficiency of 56 percent LHV. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

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.

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POWER PLANT RELIABILITY

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

E&L Westcoast, LLC (E&LW), the applicant, predicts an equivalent availability factor of 92 to 96 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Colusa Generating Station (CGS) will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, 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 reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see "Setting" below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While the applicant has predicted an equivalent availability factor of 92 to 96 percent for the CGS (see below), staff uses typical industry norms as a benchmark, rather than E&LW's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and 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 the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. How the California ISO and other control area operators will ensure system reliability is an ongoing process; protocols are still being developed and put in place that will allow sufficient reliability to be maintained under the competitive

market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

The California ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the California ISO.

The California ISO’s mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill, 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone an adequate shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff will recommend that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 660-megawatt (MW) (nominal gross output) CGS, a combined cycle power plant, providing operating flexibility (that is, ability to start up, shut down, turn down, and provide load following and spinning reserve) so that operations may be readily adapted to changing conditions in the energy and ancillary services markets (E&LW, 2006a, AFC §§1.5, 3.4.2, 3.8). The project is expected to achieve an equivalent availability factor (EAF) in the range of 92 to 96 percent (E&LW, 2006a, AFC §§1.5, 3.9.3.1). The project is projected to actually operate at a capacity factor between 60 percent and 90 percent during each year of its operating life (E&LW, 2006a, AFC §1.5).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and reliable operation (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 the project exhibits reliability at least equal to that of other power plants on that system.

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability.

Measures of power plant reliability are based on the plant's actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (E&LW, 2006a, AFC §§3.9.3.1, 3.9.4.1.2), the CGS will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the CGS will be as reliable as other power plants on the electric system and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (E&LW, 2006a, AFC §3.9.3.9) typical of the power industry. Equipment will be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in base-load service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (E&LW, 2006a, AFC §§3.4.6.5, 3.4.11.3, 3.9.3.2, 3.9.3.3, 3.9.3.4, 3.9.3.5, 3.9.3.6, 3.9.3.7, 3.9.3.8, 3.9.3.9, 3.9.4.1.2; Table 3.9-2). The fact that the project consists of two combustion turbine generators operating in parallel as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). Further, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure (E&LW, 2006a, AFC §§3.4.6.5,

3.4.11.3; Table 3.9-2). Staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (E&LW, 2006a, AFC §§3.9.3.1, 3.9.4.1.2). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The CGS will burn natural gas supplied by Pacific Gas and Electric Company (PG&E) from the PG&E system. Natural gas fuel will be supplied to the project via a new 8-inch diameter, 1,500 foot-long interconnection from the existing PG&E lines east of the site (E&LW, 2006a, AFC §§1.4, 1.9, 3.4.5, 3.9.3.7). This natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Rocky Mountains, Canada, and the Southwest. Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The CGS will use water from the Glenn-Colusa Irrigation District via the Tehama-Colusa Canal located west of the project for steam cycle, evaporative inlet air cooler makeup, fire and service water, potable water for drinking, showers, eyewash stations, and sanitation (E&LW, 2006a, AFC §§1.4, 1.8, 3.4.6, 8.14.1.4.1). Water usage will be minimized by employing an air cooled condenser as the ultimate heat sink and a zero liquid discharge system. A 400,000 gallon raw water/firewater storage tank will allow the plant to continue operating for eight hours in case of an interruption in water supply (E&LW, 2006a, AFC §§3.4.6.2, 8.14). Staff believes these sources, combined with the on-site storage capacity, yield sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), seiches (waves in inland bodies of water), and flooding will not likely represent a hazard for this project, but seismic shaking (earthquake) may present a credible threat to reliable operation.

Seismic Shaking

The site lies within Seismic Zone 3 (E&LW, 2006a, AFC §§3.3.2.2, 3.9.1.1; Appendix B); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project will be designed and constructed to the latest appropriate LORS (E&LW, 2006a, AFC Appendices A, B, C, D, E, Q). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

Flooding

The project site varies in elevation from 170 to 190 feet above mean sea level, well above the local valleys. The site does not receive stormwater runoff from off site and is not within a 100-year flood plane (E&LW, 2006a, AFC §§3.9.1.1, 8.14.1.7, 8.14.2.3). Staff believes there are no concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS) and periodically summarizes and publishes the statistics on the Internet [http://www.nerc.com]. NERC reports the following summary generating unit statistic for the years 1999 through 2003 (NERC, 2005):

For combined cycle units (All MW sizes):

Availability Factor = 89.00 percent

The gas turbines that will be employed in the project have been on the market for several years now and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor of 92 to 96 percent (E&LW, 2006a, AFC §§1.5, 3.9.3.1) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant will consist of two parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement, and

construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to enhance power supply reliability in the California electricity market by meeting the needs of the state's energy demand, contributing to the electricity reserves in the region, and providing operating flexibility (that is, ability to start up, shut down, turn down, and provide load following and spinning reserve) (E&LW, 2006a, AFC §§1.1, 1.2, 3.4.2, 3.8). The fact that the project consists of two combustion turbine generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output).

The gas turbines that will be employed in the project have been in the market for several years and can be expected to exhibit typically high availability. The applicant's prediction of an equivalent availability factor of 92 to 96 percent appears achievable. Staff believes this should provide an adequate level of reliability.

CONCLUSION

CGS predicts an equivalent availability factor of 92 to 96 percent, 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

E&LW (E&L Westcoast, LLC). 2006a. E&L, LLC/A. Welch (tn: 38511). Submittal of AFC for the Colusa Generating Station. Submitted to CEC/Docket Unit on 11/6/2006.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive report.

NERC (North American Electric Reliability Council). 2005. 1999–2003 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Sudath Arachchige and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Colusa Generating Station (CGS) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The following additional new transmission system upgrades may be required beyond the first point of interconnection to the existing transmission network. The transmission upgrades beyond the first point of interconnection are being evaluated and the associated analysis will be published in the Final Staff Assessment as an appendix to the Transmission System Engineering section.

The applicant is responsible for providing a general environmental analysis, sufficient to meet CEQA requirements for direct and indirect project impacts to the California Energy Commission (Energy Commission) for the following reconductoring projects as selected mitigation measures for N-0 and N-1 overload criteria violations:

- The reconductoring of the Western Area Power Administration's (Western) Shasta-Flanagan-Keswick 8.75-mile 230-kilovolt (kV) line.
- The interconnection of the project may require the replacement of circuit breakers at Pacific Gas and Electric's (PG&E) Cottonwood and Vaca-Dixon 230-kV substations. The replacement of four 230-kV breakers would be the project's responsibility.
- If PG&E does not complete the reconductoring of Palermo-Bogue and Palermo East Nicolaus 115-kV lines and installing a second 230/115-kV transformer at the Palermo substation by the CGS project service date, the applicant may be required to mitigate the project related impacts on these facilities.
- The post-project overloads that are increased under N-2 contingencies could be mitigated by load or generator dropping remedial action schemes (RAS).

INTRODUCTION

STAFF ANALYSIS

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conform to all applicable LORS required for safe and reliable electric power transmission. Additionally, under the CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Title 14, California Code of Regulations §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and represent the "whole of the action."

Commission staff rely on the interconnecting authority for the analysis of impacts on the transmission grid as well as the identification and approval of required new or modified facilities downstream from the proposed interconnection required as mitigation

measures. The proposed CGS would connect to a PG&E 230-kV transmission network and requires analysis by PG&E and approval of the California Independent System Operator (California ISO).

PACIFIC GAS & ELECTRIC'S ROLE

PG&E is responsible for ensuring electric system reliability in the PG&E system for addition of the proposed transmission modifications and determines both the standards necessary to achieve reliability and whether the proposed transmission modifications conform to those standards. PG&E will provide the analysis and reports in its System Impact and Facilities studies and its approval for the facilities and changes required in the PG&E system for addition of the proposed transmission modifications.

CALIFORNIA ISO'S ROLE

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 project power will be dispatched to the California ISO grid via PG&E's Colusa 230-kV substation. Therefore, CA ISO will review the studies of the PG&E system to ensure adequacy of the proposed transmission interconnection. 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, the California ISO 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, review the System Impact Study (SIS) performed by PG&E and/or any third party; provide its analysis, conclusions, and recommendations; and issue a preliminary approval or concurrence letter to PG&E. On completion of the PG&E Facility Study, the California ISO will review the study results, provide its conclusions and recommendations, and issue a final approval/disapproval letter for the interconnection of the proposed CGS. The California ISO may provide written and verbal testimony on its findings at the Energy Commission hearings.

WESTERN'S AND SMUD'S ROLES

Western and SMUD electric utilities are responsible for reviewing and commenting on the SIS submitted by the applicant. Each utility should agree upon the mitigation proposed and selected for overload criteria violations within its transmission system.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), "Rules for Construction of Underground Electric Supply and Communications Systems," formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons

engaged in the construction, maintenance, and operation or use of underground electric lines and to the public in general.

- The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage, and stability limits. 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 on 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 the allowable variations in thermal loading, voltage and frequency, and loss of load that may 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 loss of multiple 500-kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, its uncontrolled loss is not permitted (WECC, 2002).
- North American Electric Reliability Council Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles, and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC 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 Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC, 2006).
- California ISO Planning Standards also provide standards and guidelines to assure adequacy, security, and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC

or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO standards also provide some additional requirements that are not found in the WECC/NERC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (Calfiornia ISO, 2002a).

- California ISO/FERC (Federal Energy Regulatory Commission) Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The CA ISO determines the "need" for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides an operational review of all facilities that are to be connected to the California ISO grid (California ISO, 2003a).

PROJECT DESCRIPTION

The applicant has proposed to interconnect the 660-megawatt (MW) (net) Colusa Generating Station project to the four Cottonwood-Vaca Dixon 230-kV lines owned by PG&E at a site near Colusa, California. The planned operational period for the project is spring of 2010.For study (SIS and FS) purposes NCI (Navigant Consulting, Inc) has considered 700MW as the net out put of the power plant. The CGS would consist of two General Electric (GE) combustion turbine generating units (CTG) each rated at 199 MW and one GE steam turbine generating unit (STG) rated at 317 MW. The generator auxiliary load would be 15 MW resulting in a maximum net output of 700 MW at an 85 percent power factor. Each generating unit would be connected to the low side of its dedicated 18/242-kV generator step-up (GSU) transformer through 2,000-Amp gas insulated (SF6) breakers. The high side of each generator step-up transformer would be connected to the CGS switchyard via 2,000-Amp disconnect switches. The step-up transformers for the combustion turbine generating units would be rated at 18/242 kV and 205 megavolt ampere (MVA) ,while the transformer for the steam turbine generating unit would be rated 18/242 kV and 410 MVA.

SWITCHYARD AND INTERCONNECTION FACILITIES

The proposed power plant switchyard to generator tie lines are approximately 2,000 feet long, designed with 954 MCM aluminum conductor steel-reinforced (ACSR) conductors and are rated to carry the full capacity of the plant. PG&E's Cottonwood-Vaca Dixon 230-kV lines would be located approximately 1,300 feet east of the project site. The plant would be interconnected with these lines by looping the Cottonwood-Cortina, Logan Creek-Vaca Dixon, Cottonwood-Vaca Dixon, and Glenn-Vaca Dixon 230-kV lines into the project 230-kV switchyard. The proposed Colusa switchyard would use a breaker and a half configuration with six bays and 10 positions. The proposed switchyard will include 230-kV circuit breakers, 230-kV disconnect switches, and other switching gear to allow delivery of CGS output to the Cottonwood and Vaca-Dixon lines and to allow the lines to operate independently even if CGS is off line (CGS, 2005b Sections 3.4.4 and 5.0).

A total of eight new circuits will be constructed between the transmission corridor and the new switchyard (four in and four out of the switchyard). Two circuits are carried on each tower line, so there will be four tower lines between the transmission corridor as shown on figure 3.3-1 site plan. All eight circuits are within the transmission corridor adjacent to the project site. Twelve new double circuit lattice steel transmission towers will be installed to accommodate both the looping of PG&E's 230-kV lines into the plant switchyard and for the connections from the generator step-up transformers to the plant switchyard (CGS, 2005b Sections 3.4.4 and 5.0).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility (PG&E) and the control area operator (California-ISO) are responsible for insuring grid reliability. These entities determine the transmission system impacts of the proposed project and any mitigation measures needed to insure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. A SIS and a Facilities Study (FS) are used to determine the impacts of the proposed project on the transmission grid. Staff relies on the studies and any review conducted by the responsible agency to determine the effect of the project on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards. The System Impact and Facilities Studies analyze the grid with and without the proposed project under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation and thus are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties. If the studies show that the interconnection of the project causes 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 California ISO or interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as the "whole of the action," the Energy Commission must analyze these modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDY

The System Impact Study (SIS) was performed by Navigant Consulting, Inc. at the request of E&L Westcoast, LLC to identify the transmission system impacts the CGS would cause on PG&E's 115/230/500-kV system. The SIS included a Power Flow Study, Short Circuit Study, and Dynamic Stability Analysis (CGS, 2005a, System Impact

Study). The study modeled the proposed CGS for a net output of 700 MW. The base cases included all approved major transmission projects in PG&E, and the transmission system for Western, SMUD, and the Transmission Agency of Northern California (TANC). The detailed study assumptions are described in the SIS. The Power Flow studies were conducted with and without the CGS connected to the PG&E grid at the Colusa switchyard using 2010 Summer Peak, 2010 Summer Off Peak, and 2010 Spring Off Peak base cases. The Power Flow study assessed the project's impact on thermal loading of the transmission lines and equipment. The governor power flow analysis was performed to assess project-rated impacts for 500-kV N-1 contingencies and selected 500-kV N-2 contingencies on the north of the Tesla/Tracy transmission system. Dynamic stability studies were conducted with the CGS using the 2007 Summer Peak base case to determine whether the CGS would create instability in the system following certain selected outages. Short circuit studies were conducted with and without the CGS to determine if the CGS would result in overstressing existing substation facilities.

Power Flow Study Results

The SIS identified existing overloads in the power systems. The overloading problems affect transmission line facilities under N-0 (normal conditions), N-1 (single contingency), and N-2 (double contingency) conditions. The transmission SIS identified six overload conditions under N-0 and N-1 that require mitigation. The proposed mitigation measures include;

- Reconductoring transmission lines.
- Installing a second transformer or using remedial action schemes to drop the project generation.
- Replacing or modifying the existing protection and monitoring equipment within the existing substations.

The SIS results suggest some adverse impacts under normal conditions of the network due to interconnection of the CGS as proposed. Following are the study results and mitigation measures based on conducted contingency analysis.

Overloads and Mitigation

The SIS results indicate that the addition of CGS would cause overloads under normal system conditions under each of the six base case scenarios studied. Six pre-project overloads were aggravated by the addition of CGS under 2010 Summer Peak system conditions. The transmission lines below represent the worst incremental overloading under N-0, N-1 and multiple N-2 contingencies.

In addition to the overloads mentioned below, there are four other facilities that are not overloaded for N-0 or N-1contingency conditions but that experience overloads due to N-2 contingencies. The facility overloads that are increased or additional overloads could potentially be mitigated by load or generator dropping (RAS).

- Overload: Western's O'Banion–Elverta 230-kV transmission line overloads under N-0, N-1, and N-2 system conditions without CGS, and the addition of CGS would

exacerbate the pre-project overloads. The SIS identified 23 N-1 outages that increase the post-project overloads from 3 percent to 6 percent.

  - Mitigation: The O'Banion–Elverta overload is mitigated by constructing a new, approximately 26-mile-long, double-circuit, 230-kV transmission line from the O'Banion substation to the Elverta substation. Western, SMUD, and the City of Roseville are currently evaluating the Environmental Impact statement (EIS) and the Environmental Impact Report (EIR). The draft supplemental EIS and EIR release date was expected in Fall/winter 2006, and the Record of Decision is expected in April 2008. The anticipated in-service date for this mitigation project has not yet been identified. Should this new line not be constructed by the CGS operation date, the CGS would have to devise other methods, such as a remedial action scheme, to curtail the project generation to reduce the post-project overloads,.

- Overload: PG&E's Palermo-East Marysville Junction 2 115-kV transmission line overloads under N-0, N-1, and N-2 system conditions without CGS, and the addition of CGS exacerbates these pre-project overloads. A 2 percent incremental overload would occur under N-1 contingency due to outage of Palermo-Pease or Palermo-Bouge 115-kV transmission lines.

  - Mitigation: The Palermo-East Marysville Junction 2 115-kV overload is mitigated by reconductoring the Palermo-Bogue and Palermo-East Nicolaus 115 kV-lines and installing a second 230/115-kV transformer at the Palermo substation by 2007 (PG&E project #T686B). If PG&E does not complete the reconductoring of Palermo-Bogue and Palermo East Nicolaus 115-kV lines and installing a second 230/115-kV transformer at the Palermo substation by the CGS project service date, the applicant should mitigate the project related impacts on these facilities. PG&E indicated that an environmental evaluation is currently being conducted of the Palermo-Bogue and East Nicolaus reconductoring project; the service date is expected to be end of 2008 or early May 2009. Based on communication with PG&E and SMUD, these two PG&E projects are underway and would be completed by the CGS in-service date (CGS, draft summary of the Transmission System Upgrades, submitted by SMUD, dated April 3, 2007).

- Overload: PG&E's Palermo 230/115-kV transformer overloads under pre-project N-1 and N-2 system conditions. The worst post-project incremental overloading is 2 percent under an N-1 contingency.

  - Mitigation: Install a second 230/115-kV transformer at the Palermo substation by 2007. This mitigation is a planned PG&E project (PG&E project #T686B) that is needed whether or not the CGS is constructed.

- Overload: PG&E's Olinda 500/230-kV transformer overloads under N-1 and N-2 contingency conditions. The N-1 outage of the Captain Jack-Olinda 500-kV line causes a pre-project overload of 16 percent on the Olinda 500/230-kV transformer.

  - Mitigation: Install a second transformer at Olinda or use a remedial action scheme to drop CGS generation when there is a critical 500-kV contingency.

- Overload: Western's Flanagan-Shasta-Keswick 230-kV transmission line overloads under pre-project system conditions, and the addition of CGS would increase the pre-project overloads by 4 to 5 percent. The SIS provides Category B contingency overloads on the Flanagan-Shasta-Keswick 230-kV transmission line (SIS, Table 6.3, p. 11).
    - Mitigation: The Flanagan-Shasta-Keswick 230-kV line overloads would be mitigated by reconductoring the 8.75 mile Shasta-Flanagan-Keswick lines. Since the reconductoring of these transmission lines is required solely based on overloads caused by CGS operation, the applicant has sought to satisfy the Energy Commission environmental guideline by providing the information in the AFC process. Western will conduct its own environmental review of the reconductoring as part of its approval process. The preliminary evaluation indicates that the reconductoring efforts would likely be excluded from detailed analysis under the National Environmental Policy Act (NEPA) (CGS, draft summary of the Transmission System Upgrades, submitted by SMUD, dated April 3, 2007).

- Overload: SMUD's Hurley S-Carmichael 230-kV line overloads under pre-project system conditions. The addition of CGS increases the overloads caused by the outage of the Elverta South-Elverta West 230-kV transmission line by 2 percent.
    - Mitigation: The Hurley S-Carmichael 230-kV line overload would be mitigated by expanding Western's Folsom 230-kV substation and looping SMUD's existing Orangeville-Lake 230-kV line into the substation via two short tie lines. The anticipated in-service date for this project has not yet been identified. Should this project not be constructed by the CGS operation date, the post-project overloads could be mitigated by implementing RAS. It is expected that the tie in will be categorically exempt under CEQA and categorically excluded under the NEPA (CGS, draft summary of the Transmission System Upgrades, submitted by SMUD, dated April 3, 2007).

Dynamic Stability Studies

Dynamic Stability studies for CGS were conducted using 2010 Summer Peak base case to determine if the CGS would create any adverse impact on the stable operation of the transmission grid following selected California ISO categories "B" (N-1) and "C" (N-2) outages (CGS, 2005b, SIS).The results indicate there are no identified transient stability concerns on the transmission system following the selected disturbances, as outlined in the SIS for integration of the CGS.

Post-Transient Power Flow Study Results

NERC/WECC planning standards require that the system maintain post-transient voltage stability when either critical path transfers or area loads increase by 5 percent for category "B" contingencies and 2.5 percent for category "C" contingencies. Post-transient studies conducted for similar or larger generators in the area concluded that voltage remains stable under N-1 and N-2 contingencies. The post-transient studies did not indicate any voltage deviations from the PG&E guidelines. Staff will provide an appendix to the Final Staff Assessment to discuss CEQA impacts beyond the first point of interconnection by the CGS.

Short Circuit Study Results

Short circuit studies were performed to determine the degree to which the addition of the CGS increases fault duties at PG&E's substations; adjacent utility substations; and the other 115-kV, 230-kV, and 500-kV busses within the study area. The busses at which faults were simulated, the maximum three phase and single line-to-ground fault currents at these busses both without and with the CGS, and information on the breaker duties at each location are summarized in Table 9.1 of the System Impact Study report (CGS, 2005b, SIS Table 9.1, p. 19). The SIS indicates that there would likely be overstressed breakers at the Cottonwood and Vaca-Dixon substations for the conditions studied. Based on the "close-in fault" analysis and PG&E's replacement policy, the following breaker replacements would be the responsibility of the project:

- Cottonwood 230-kV substation breakers 412, 522, and 542.
- Vaca-Dixon 230-kV substation breaker 412.

COMPLIANCE WITH LORS

The SIS indicates that the project interconnection would comply with NERC/WECC planning standards and California ISO reliability criteria. The applicant will design, build, and operate the proposed 230-kV overhead transmission lines. The proposed modifications to the Cottonwood and Vaca-Dixon substations will be done by PG&E within the substation fenced yard.

Staff concludes that assuming the proposed conditions of certification are met; the project would likely meet the requirements and standards of all applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

The proposed Colusa Generating Station (CGS) outlet lines and terminations are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS).

The following additional new transmission facilities upgrades may be required beyond the first point of interconnection as a direct or indirect result of the project to the existing transmission network. Staff will provide an analysis of the project impacts beyond the first point of interconnection in the Final Staff Assessment.

The applicant is responsible for providing a general environmental analysis sufficient to meet CEQA requirements for direct and indirect project impacts to the California Energy Commission (Energy Commission) for the following reconductoring projects as selected mitigation measures for N-0 and N-1 overload criteria violations:

- The reconductoring of the Western Area Power Administration's (Western) Shasta-Flanagan-Keswick 8.75-mile 230-kilovolt (kV) line.
- The interconnection of the project may require the replacement of circuit breakers at Pacific Gas and Electric's (PG&E) Cottonwood and Vaca-Dixon 230-kV substations. If the replacement of the four 230-kV breakers is required; that replacement would be the project's responsibility.

- If PG&E does not complete the reconductoring of Palermo-Bogue and Palermo East Nicolaus 115-kV lines and installing a second 230/115-kV transformer at the Palermo substation by the CGS project service date, the applicant could be required to mitigate the project related impacts to these facilities.
- The post-project overloads that are increased under N-2 contingencies could be mitigated by load or generator dropping remedial action schemes (RAS).

If the Energy Commission approves the project, staff recommends the following conditions of certification to insure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

At least 60 days prior to the start of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

TRANSMISSION SYSTEM ENGINEERING 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 Prior to the start of construction, the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, 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 civil, geotechnical or civil, and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

At least 30 days prior to the start of rough grading (or a lesser number of days mutually agreed to by the project owner and the CBO), 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 (California Building Code, 1998, 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 shall reference this condition of certification.

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 disapproval, and the revised corrective action required obtaining the CBO's approval.

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. The number of electrical drawings approved, submitted for approval, and still to be submitted.

At least 30 days prior to the start of each increment of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

1. The CGS will be interconnected to the PG&E grid via a 230-kV, 954-ACSR, approximately 2,000-foot double circuit tie line. The proposed Colusa switchyard would use a breaker and a half configuration with six-bays and 10 positions.

2. 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.

3. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

4. 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.

5. The project conductors shall be sized to accommodate the full output from the project.

6. Termination facilities shall comply with applicable PG&E interconnection standards.

7. The project owner shall provide to the CPM:

    a. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

    b. Executed project owner and California ISO Facility Interconnection Agreement.

At least 60 days prior to the start of construction of transmission facilities (or a lessor number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment.

2. 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 NESC; Title 8, California Code of Regulations,

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”; NEC; applicable interconnection standards, and related industry standards.

3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** 1) through 6) above.

4. The final Detailed Facility Study, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements **TSE-5** 1) through 6) and have not received CPM and CBO approval and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of the conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-8 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC; Title 8, CCR, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

1. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards, and these conditions shall be provided concurrently.

2. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the 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."

3. 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 (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol. Posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol. Posted April 1998.

California ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards. February 2002.

CGS (Colusa Generating Station). 2005a. E&L Westcoast, LLC, Colusa Generating Station (System Impact Study) submitted to the California Energy Commission.

CGS (Colusa Generating Station). 2005b. E&L Westcoast, LLC, Colusa Generating Station Application for Certification. Submitted to the California Energy Commission.

NERC/WECC (North American Reliability Council/Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards. August 2002.

DEFINITION OF TERMS

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, which provides that dispatched generation and transmission loading (imports) will not violate criteria.

Emergency overload – See “Single Contingency.” This is also called an L-1.

Kcmil or KCM – Thousand circular mil. A unit of the conductor’s cross sectional area When divided by 1,273, the area in square inches is obtained.

Kilovolt (kV) A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

Megavar One megavolt ampere reactive.

Megavars Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA) – A unit of apparent power. It equals the product of the line voltage in kilovolts, current in amperes, and the square root of 3, divided by 1,000.

Megawatt (MW) – A unit of power equivalent to 1,341 horsepower.

Normal operation/normal overload – The condition arrived at when all customers receive the power they are entitled to, without interruption and at steady voltage, and with no element of the transmission system loaded beyond its continuous rating.

N-1 condition – See “single contingency.”

Outlet Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power flow analysis – A 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 – Generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial action scheme (RAS) – An automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

SF6 (sulfur hexafluoride) – An insulating medium.

Single contingency – Also known as “emergency” or “N-1 condition,” the occurrence when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable – Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard An integral part of a power plant and used as an outlet for one or more electric generators.

Thermal rating – See “ampacity.”

TSE Transmission system engineering.

Tap A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a 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

Jack W. Caswell, Project Manager

SUMMARY OF CONCLUSIONS

The Colusa Generating Station (CGS) applicant has provided two possible alternative sites. The alternative project meet Pacific Gas and Electric Company's (PG&E) basic requirements published both in its Request for Offer in 2004 and in a contract signed with E&L Westcoast, LLC (E&LW) in 2006. The two alternative project sites analyzed are Holthouse Ranch, located 14 miles north of Williams and 5 miles west of Interstate 5 (I-5) near Delevan Road and PG&E's Cortina Substation, located 4.5 miles south of Williams on Walnut Drive (**ALTERNATIVES Figures 1 and 2**).

All three sites have unresolved impacts associated with the Colusa County land use ordinances as they relate to the general plan and zoning for the preferred CGS project site and the two proposed alternative sites. All three sites are in land use areas zoned Agricultural Use and will require land use amendments in order to be compliant with local laws, ordinances, regulations, and standards (LORS). The details on LORS compliance can be reviewed in the **Land Use** technical section of the Preliminary Staff Assessment (PSA). Additionally, transmission system impacts have been identified beyond the first point of interconnection for all three sites. Complete mitigation measures have not been provided by the applicant, nor agreed to by the transmission system owners at this time. The details of the transmission system impacts can be reviewed in the **Transmission System Engineering** technical section of the PSA. The downstream impacts beyond the first point of interconnection will be further analyzed in a Transmission System Engineering Appendix A in the Final Staff Assessment when additional information has been provided by the project applicant. A summary of the impacts for all technical sections can be reviewed in the **Executive Summary** of the PSA.

The applicant is working closely with the County of Colusa and the appropriate transmission system owners and operators to mitigate the project's impacts to less than significant. Staff anticipates resolution on the land use LORS and transmission system impacts for the preferred site before publication of the FSA.

The environmental impacts at the identified feasible sites were similar. However, given that the impacts identified above are similar at all locations to include the availability of infrastructure connections, (for example, transmission lines, gas lines, and water lines), it is staff's opinion that the proposed CGS site is superior when compared to the two alternative sites due to the lack of any significant benefits at the alternative sites.

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 impact electrical supply reliability throughout California.

INTRODUCTION

The purpose of staff's alternatives analyses is to describe a range of reasonable project alternatives that could feasibly attain the objectives of the proposed CGS project and avoid or substantially lessen one or more of the significant effects of the project. If the Energy Commission determines that the proposed project will result in significant adverse impacts and identifies an alternative that meets the project goals and CEQA criteria, it cannot license the project unless it finds that the benefits of the project outweigh the impacts and that the alternative is infeasible. However, the Energy Commission does not have the authority to require alternative configurations or alternative technology designs or to require the applicant to move the proposed project to another location. If the applicant moves its proposed project to one of the alternative sites, Energy Commission staff will analyze any new proposed site at the same level of detail as the original proposed site.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

ENERGY COMMISSION SITING REGULATIONS

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" (Title 20, CCR §1765).

CEQA Guidelines Section 15126.6(a) (Title 14, California Code of Regulations) requires 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." In addition, the analysis must address the No Project Alternative (Title 14, CCR §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 (Title 14, CCR §15126.6[f][3]).

SCOPE AND METHODOLOGY OF THE ALTERNATIVES ANALYSIS

In order to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project, staff must first determine the appropriate scope of analysis. To do so, it is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding significant impacts.

To prepare this alternative analysis, staff used the methodology summarized below:

- describe the basic objectives of the project;

- identify the potential significant environmental impacts of the project;
- identify and evaluate technology alternatives to the project that could mitigate project impacts;
- identify and evaluate alternative sites for the project to determine whether these sites could reduce or eliminate project impacts; and
- evaluate the "No Project" alternative to determine whether this alternative would be superior to the project as proposed.

Alternatives to the proposed project include two general types: (1) other sites where the proposed project (a natural gas burning turbine) could be utilized and (2) different power generation technologies (not requiring natural gas as fuel). These alternatives are discussed and evaluated below.

PROJECT OBJECTIVES

After studying the applicant's Application for Certification (AFC), Energy Commission staff has determined CGS project objectives to be:

- satisfy PG&E's "Request for Offer" to obtain a power resource at the proposed location;
- provide 660 megawatts (MW) of electrical energy to PG&E for its own use;
- locate the project near key infrastructure (natural gas, high-voltage transmission lines, and water resource);
- have minimal impact on the surrounding communities, environment and northern central valley; and
- locate proposed plant in northern California.

SUMMARY DESCRIPTION OF PROPOSED PROJECT

The proposed CGS project is a proposed 660-MW natural gas-fired, dry-cooled, combined-cycle electric generating facility. This project is in response to PG&E's "Request for Offer" and a contract agreement signed with E&LW in 2006. The contract between PG&E and E&LW would transfer the ownership and operation of the proposed power plant to PG&E after completion of commissioning. The proposed CGS would be located in the unincorporated portion of Colusa County, approximately 14 miles north of the City of Williams and 4 miles west of Interstate 5. The site is generally bounded by the Tehama-Colusa Canal to the west, the Glenn/Colusa county line to the north, the Glenn-Colusa Canal to the east, and Dirks Road to the southeast. The project would be located within a 31-acre portion of a 100-acre parcel site leased from the Holthouse Ranch. The power plant site access road, water supply intake access road, and new transmission interconnection would require an additional 2.7 acres (**Project Description Figures 1 and 2**).

Grazing land surrounds the 100-acre leased area immediately to the west, north, and south. The nearest actively farmed land is located approximately one mile southeast of

the proposed project location. The PG&E Delevan natural gas compressor station and Cottonwood to Vaca-Dixon transmission corridor (230-kilovolt [kV] overhead electric lines) are located immediately to the east of the proposed project site (**Project Description Figures 2 and 3**).

Colusa County currently designates the project site as Agriculture-General and zones the site as Exclusive Agriculture. The applicant has submitted applications to the Colusa County Planning and Building Department requesting a general plan amendment and rezone of the site to designations more consistent for an industrial use. Please see the **Land Use** section of this document for a discussion of the project's land use consistency with local land use plans.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff's assessment of environmental impacts is presented in detail in the individual sections of this PSA. No significant impacts are identified, assuming that all recommended mitigation is incorporated. The issues of most concern for the CGS project are summarized below and in detail in the appropriate technical section in the PSA.

- **Air Quality:** Staff recognizes that the construction of the CGS may degrade the area's existing air quality by increasing emissions of particulate matter less than 10 microns in size (PM10). The project applicant intends to ensure full mitigation of impacts from nitrogen oxides (NOx), carbon monoxide (CO), sulfur oxides (SOx), precursor organic compounds (POC), and any other air quality issues. However, with implementation of staff's mitigation measures air quality emissions would be reduced to a less than significant level. The applicant would be specifically required to reduce overall air emissions in the surrounding area through the purchase of emission reduction credits. The **Air Quality** section presents a thorough discussion of air quality impacts and mitigation measures.
- **Biological Resources:** Staff recognizes that the construction of the CGS may cause permanent, temporary, and possible cumulative impacts to state and federally listed animal species (for example, Swainson's hawk, giant garter snake, vernal pool fairy shrimp, and vernal pool tadpole shrimp). Impacts to these species could be mitigated to less than significant levels, should they be required, by the purchase of off-site compensatory credits in Colusa County and through the implementation of avoidance mitigation measures presented in the **Biological Resources** section.
- **Land Use:** The project's proposed industrial use currently does not comply with the site's current local land use designation (Agricultural Use). In order for the proposed use to comply with the designated land use, the Colusa County General Plan and Zoning Code will require an amendment to industrial use. Additionally, the proposed project will require a height zoning variance. Without the land use amendments, the project is inconsistent with state and local land use regulations. Therefore, staff cannot conclude that the project will comply with LORS. A detailed discussion of land use code for Colusa County is presented in the **Land Use** section.

SCREENING CRITERIA USED TO SELECT ALTERNATIVE SITES

The purpose of this section is to evaluate alternative project sites. The evaluation criteria for each site included the following:

- Will the alternative fulfill the project objectives and siting criteria?
- Will it reduce the potential significant impacts identified for the proposed project?
- Will it cause other significant environmental impacts?

In considering site alternatives, staff defined a geographic area within which alternative sites were evaluated. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for location alternatives to locations near Colusa County. These location alternatives are consistent with the applicant's project objectives and siting criteria.

Potential impacts that would affect all alternative sites are air emissions and loss of habitat for biological resources. Land use compatibility was also evaluated for each alternative site. In addition, staff compared the advantages and disadvantages of each alternative site, by issue area, to the proposed project.

Potential alternatives sites were considered if they met the following requirements:

- availability of sufficient land to construct and operate a generating facility of this size (approximately 100 acres would be required) and
- availability of connections to infrastructure (for example, gas, water, transmission) within a reasonable distance.

ALTERNATIVE SITES ANALYZED

The following alternative sites were examined:

- southeast portion of the Holthouse Ranch boundary (**ALTERNATIVES Figure 1**).
- western area adjacent to PG&E's Cortina Substation (**ALTERNATIVES Figure 2**).

SOUTHEASTERN HOLTHOUSE RANCH SITE

This alternative site is currently zoned as Agriculture by Colusa County. A power plant in this area would have the same land use issues as the preferred alternative in that the proposed use is inconsistent with the County General Plan. The site is also zoned and used for agriculture. This site is located approximately 14 miles north of the community of Williams, approximately 5 miles west of I-5 near Delevan Road near the southeastern boundary of the Holthouse Ranch property in Colusa County. The same landholder owns Holthouse Ranch and the preferred site. The site is in the same proximity to PG&E's natural gas and transmission lines and the Tehama-Colusa and Glenn-Colusa Canals as the proposed project site (**ALTERNATIVES Figure 1**).

The following information presents advantages and disadvantages of the southeastern Holthouse Ranch alternative site.

Advantages

- **Infrastructure Connection:** Adequate water resources, natural gas, and transmission infrastructure are located near the site.

Disadvantages

- **Agriculture**: this land is being used for grazing land and would require a General Plan change amendment.
- **Land Use:** A General Plan amendment would be required. The site is not zoned for industrial use and would require a change of land use designation and zoning, as would the proposed project site, to comply with land use regulations.
- **Biological Resources:** Potential for significant biological impacts exists due to the presence of wetlands and vernal pools impacted by the transmission interconnection.

Staff finds that this site has no advantages over the applicant's preferred site for land use and biological resources. Additionally, the nearby location of infrastructure connections required to operate the facility and deliver electrical generation into the transmission grid system offer no significant advantages over infrastructure connections for the proposed project.

PG&E'S CORTINA SUBSTATION SITE

This alternative site is located approximately 4.5 miles southwest of the community of Williams and west of I-5, adjacent to PG&E's Cortina Substation, which is connected to the PG&E 230-kV transmission lines. The site is in the same proximity to PG&E's natural gas and transmission lines and the Tehama-Colusa and Glenn-Colusa Canals as the proposed project site and alternative. However, the site is within 1.7 miles of a residence and within 2 miles of many others. The site is also zoned and used for agriculture (**ALTERNATIVES Figure 2**).

The following information presents advantages and disadvantages of the PG&E Cortina Substation alternative site.

Advantages

- **Infrastructure Connection:** Adequate water resources, natural gas, and transmission infrastructure are located near the site.

Disadvantages

- **Agricultural Resources:** In order to create a large enough footprint for the project, adjacent farmland currently in active agricultural production would have to be taken out of production.
- **Biological Resources:** A reconnaissance-level biological survey of the Cortina Substation site was conducted in 2001 (URS 2001). The alternative site appears to be of similar habitat as the proposed project site; therefore, similar biological resources could result as a function of lost habitat. Additionally, Swainson's hawk habitat and potential nest sites for other raptors are located within one mile of the

proposed site; therefore, the project has a greater potential to impact special-status raptor species (URS 2001). Thorough biological surveys were not conducted, nor were project components thoroughly developed or studied for this alternative site, so impacts to other sensitive species are unknown.

- **Land Use:** The site is not zoned for industrial use. A change of land use designation and zoning would be required for this site just as for the proposed project site in order to comply with land use regulations. Negotiations would be required with mutable landowners for site control.
- **Proximity to Communities:** The site is closer to multiple residences than the proposed project and could therefore have a greater potential for impact (such as noise and hazardous material transport, and so forth) on those residences.
- **Visual Resources:** The site is closer to multiple residences than the proposed site and could therefore have a greater visual impact to the public.

Staff finds that this site has certain biological, land use, proximity, and visual disadvantages when compared to the applicant's preferred site, as indicated above. Additionally, the location of infrastructure connections required to operate the facility at this site and deliver electrical generation into the transmission grid system offer no significant advantages over the applicant's proposed site.

THE "NO PROJECT ALTERNATIVE"

CEQA Guidelines and Energy Commission regulations require consideration of the "No Project" alternative. This alternative assumes that the project is not constructed and compares the impacts of that scenario to those of the proposed project.

The No Project Alternative would not provide needed electric generation to serve the state's electricity demand. Also, the "No Project" alternative would eliminate the expected economic benefits that the proposed project would bring to Colusa County, including increased property taxes, employment, sales taxes, and sales of services, manufactured goods, and equipment (see **Socioeconomics** section).

While no unmitigable significant impacts have been identified for this project, the No Project Alternative would eliminate all impacts to the environment that would result from the construction and operation of the plant at the proposed site.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives that did not satisfy the screening criteria for inclusion in the analysis for a variety of reasons as described below.

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered several alternative generation technologies that do not burn fossil fuels: solar, wind, biomass, geothermal, and hydropower.

Solar Generation

Solar resources would require large land areas in order to generate 660 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure (such as desert areas of San Bernardino County), central receiver solar thermal projects require approximately 5 acres per MW, so 660 MW would require approximately 3,300 acres of land area taken by the proposed plant site.

Although solar facilities significantly reduce or eliminate air emissions, they can have significant visual effects since they involve many solar collector structure spread over large areas of land. Water consumption for solar generation is substantially less than for a natural gas-fired plant because the need for thermal cooling is reduced.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities generation require near access to transmission lines. Large solar thermal plants are optimally located in desert areas; in these remote areas transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar energy technologies are considered as infeasible for the project location and needs.

Wind Generation

Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW.

Although air emissions are significantly reduced or eliminated for wind facilities, such turbines can have significant visual effects. Wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades.

Wind resources would require large land areas in order to generate 660 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally require large tracts of land—approximately between 5 and 17 acres to generate one megawatt (CEC, 1996), resulting in as much as 11,220 acres required to generate 660 MW. This land requirement is significantly more than the amount of land used by the proposed project and much greater than the land held by the Holthouse Ranch. With these characteristics, wind energy generation is not feasible in this location.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source) or agricultural waste. The fuel is burned to generate steam. Biomass facilities generate substantially greater quantities of air pollutant emissions than natural gas burning facilities. In addition, biomass plants are typically sized to generate less than 25 MW, which is substantially less than the capacity of the 660-MW CGS project. Many biomass facilities would be required to meet the project goal of generating 660 MW. Land and project infrastructure impacts would be significantly more damaging to the environment than the proposed project. Emissions from the large number of generating units would be greater than the proposed project, and air quality requirements would not be achievable.

Geothermal

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. Geothermal technology is limited to areas where geologic conditions resulting in high subsurface water temperatures occur. There are no viable geothermal resources in the location of the proposed project in Colusa County.

Hydropower

Hydropower facilities require large quantities of water (either stored or flowing water) and sufficient topography to allow power generation as water drops in elevation and flows through a turbine. Neither the water resources nor the topographic conditions are present in the project region.

CONCLUSIONS

Staff does not believe that alternative technologies (for example, geothermal, solar, wind, biomass, and hydroelectric) currently present feasible alternatives to the proposed project, since the major objective of the CGS project is to provide 660 MW of electricity with minimal impacts to the environment and the public. While the No Project Alternative would eliminate all impacts of this project, it would not achieve the benefits of needed reliable electrical energy resources in California.

Neither of the alternative sites discussed in this section is considered superior to the applicant's proposed site: both sites have greater disadvantages than advantages when compared to the proposed project. Although the southeastern Holthouse Ranch site is similar to the proposed site, the site would potentially have greater impacts to biological resources due to the presence of wetlands and vernal pools. Neither of the alternative sites is developed; therefore, sensitive species could exist at both sites. Additional detailed biological surveys would have to be conducted to determine the presence of and impact to sensitive species at the alternative sites. The proposed site has no identified unmitigable significant impacts. Therefore, staff does not recommended an alternative site over the proposed CGS preferred site location.

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GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Lance Shaw, Compliance Project Manager

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 to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Fencing for the site is also considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

1. the installation of environmental monitoring equipment;

2. a soil or geological investigation;

3. a topographical survey;

4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and

5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, where the power plant has reached reliable steady-state production of electricity at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;

2. resolving complaints;

3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

4. documenting and tracking compliance filings; and

5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight, and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2. all monthly and annual compliance reports filed by the project owner;

3. all complaints of noncompliance filed with the Energy Commission; and

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all of the other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegate agencies 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 onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;

2. providing appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of work or other evidence that the requirements are satisfied.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with

a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, it shall so request in its submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner’s **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates starting project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner’s own risk. Any approval by Energy Commission staff is subject to change based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions

of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;

2. the condition number;

3. a brief description of the verification action or submittal required by the condition;

4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);

5. the expected or actual submittal date;

6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and

7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and eight copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and submitted as attachments to the Monthly Compliance Report;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. a cumulative listing of any approved changes to conditions of certification;

7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. a listing of the month's additions to the on-site compliance file; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and submitted as attachments to the Annual Compliance Report;

4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a listing of the year's additions to the on-site compliance file;

9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual fee currently sixteen thousand eight hundred fifty dollars ($16,850), which will be adjusted annually on July 1. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, 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 remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all

necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Insignificant Project Changes and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process takes approximately one month to complete, and requires public notice and approval by the full Commission.

Insignificant Project Change

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification. This process usually takes less than five working days to complete.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.
Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site

visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and

4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint with the Energy Commission's Dockets Unit. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	**DATE**
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ all pre-construction conditions have been complied with, ▪ the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings: _____
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: _____ Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

COLUSA GENERATING STATION PROJECT
PREPARATION TEAM

Executive Summary	Jack W. Caswell
Introduction	Jack W. Caswell
Project Description	Jack W. Caswell
Air Quality	William Walters
Biological Resources	John Mathias
Cultural Resources	Dorothy Torres
Hazardous Materials Management	Alvin J. Greenberg, Ph.D. and Rick Tyler
Land Use	Mark R. Hamblin
Noise and Vibration	Steve Baker
Public Health	Alvin J. Greenberg, Ph.D.
Socioeconomic Resources	Amanda Stennick
Soils and Water Resources	Richard Latteri
Traffic and Transportation	David Flores
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	William Kanemoto
Waste Management	Ellie Townsend-Hough
Worker Safety and Fire Protection	Alvin J. Greenberg, Ph.D. and Rick Tyler
Facility Design	Shabab Khoshmasrab, P.E.
Geology and Paleontology	Patrick Pilling, Ph.D., P.E., G.E.
Power Plant Efficiency	Shahab Khoshmashrab
Power Plant Reliability	Shahab Khoshmashrab
Transmission System Engineering	Sudath Arachchige and Mark Hesters
Alternatives	Jack W. Caswell
General Conditions including Compliance Monitoring & Facility Closure	Lance Shaw
Project Secretary	Angela Hockaday

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE *COLUSA GENERATING STATION PROJECT*

Docket No. 06-AFC-9
PROOF OF SERVICE
(REVISED 5/16/2007)

INSTRUCTIONS: All parties shall 1) send an original signed document plus 12 copies OR 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed OR electronic copy of the documents that shall include a proof of service declaration to each of the individuals on the proof of service:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Andy Welch, Vice President
Competitive Power Ventures,
8403 Colesville Rd, Suite 915
Silver Spring,MD 20910
awelch@cpv.com

APPLICANT'S CONSULTANTS

Dale Shileikis – URS
Vice President
221 Main Street, Suite 600
San Francisco, CA 94105-1917
dale_shileikis@urscorp.com

Mark Strehlow – URS
Senior Project Manager
1333 Broadway, Suite 800
Oakland, CA 94612
Mark_Strehlow@URSCorp.com

COUNSEL FOR APPLICANT

Mike Carroll - Latham & Watkins
Attorneys at Law
650 Town Center Drive, 20th Floor
Costa Mesa, CA 92626-1925
michael.carroll@lw.com

INTERESTED AGENCIES

Larry Tobias
Ca. Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630
LTobias@caiso.com

Electricity Oversight Board
770 L Street, Suite 1250
Sacramento, CA 95814
esaltmarsh@eob.ca.gov

Stephen M. Hackney, Director
Colusa County
Department of Planning and Building
220 12th Street
Colusa, CA 95932
shackney@countyofcolusa.org

Harry Krug, APCO
Colusa County APCD
100 Sunrise Blvd. #F
Colusa, CA 95932-3246
hak@countyofcolusa.org

Steve Tuggle
Environmental Manager
Sierra Nevada Region
Western Area Power Administration
114 Parkshore Drive
Folsom, CA 95630
tuggle@wapa.gov

Mark Wieringa
Western Area Power Administration
12155 W. Alameda Parkway
P.O. Box 281213
Lakewood, CO 80228
wieringa@wapa.gov

INTERVENORS

Emerald Farms
c/o Allen L. Etchepare
P.O. Box 658
4599 McDermott Road
Maxwell, CA 95955
jme@efarmsmail.com
ale@efarmsmail.com

*Pacific Gas and Electric Company
c/o Scott A. Galati, David L. Wiseman
GalatiBlek LLP
555 Capitol Mall, Suite 600
Sacramento, CA 95814
sgalati@gb-llp.com
dwiseman@gb-llp.com

*Pacific Gas and Electricity Company
c/o Andrea Grenier
Grenier & Associates, Inc.
1420 East Roseville Parkway,
Suite 140-377
Roseville, CA 95661
andrea@agrenier.com

ENERGY COMMISSION

JOHN L. GEESMAN
Presiding Member
jgeesman@energy.state.ca.us

JAMES D. BOYD
Associate Member
jboyd@energy.state.ca.us

Susan Brown
Adviser to Commissioner Boyd
sbrown@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

Jack Caswell
Project Manager
jcaswell@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Public Advisor
pao@energy.state.ca.us

DECLARATION OF SERVICE

I, Angela Hockaday, declare that on August 1, 2007, I deposited copies of the attached Preliminary Staff Assessment Re: Colusa Generating Station (06-AFC-9) in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original signature in Dockets
Angela Hockaday